SOME ASPECTS OF THE GEOCHEMISTRY OF GALLIUM IN SILICATE ROCKS AND STONY METEORITES

by

J.P. WILLIS

Department of Geochemistry,
University of Cape Town.

VOLUME 2

Tables

November, 1978

Thesis submitted in fulfilment of the requirements for the degree of Ph.D. at the University of Cape Town

CONTENTS

TABLE 1

SOME FUNDAMENTAL DATA FOR Ga AND RELATED ELEMENTS

Property		Ga	Al	Fe^{3}	Fe^{2}	Cr^{3}	Zn	Ti^{4}
Atomic number		31	13	26	26	24	30	22
Atomic weight		69.7	27.0	55.8	55.8	52.0	65.4	46.0
Ionic radius (Å)	IV	0.55	0.47	0.57	0.71		0.68	
	VI	0.70	0.61	0.63L 0.73H	0.69L 0.86H	0.70	0.83	0.69
Electron assignment		s^2p^1	s^2p^1	d^6s^2	d^6s^2	d^5s^1	$d^{10}s^2$	d^2s^2
Radius ratio Element/O	IV	.42	.36	.44	.55		.52	
	VI	.53	.46	.52	.59	.53	.63	.52
Ionisation Potential eV	I1	6.0	6.0	7.8	7.8	6.7	9.4	6.8
	I2	20.4	18.7	16.2	16.2	16.6	17.9	13.6
	I3	30.6	28.3	30.6		32.1		27.6
	I4							43.0
I1+I2+I3+I4		57.0(3+)	53.0(3+)	54.6(3+)	24.0(2+)	55.4(3+)	27.3(2+)	91.0(4+)
Electronegativity kcal/g-atom		1.7	1.6	1.9	1.8	1.7	1.6	1.6
Geochemical affinity*		L,S,C	L	L,S,C	L,S,C	L,C	L,C	L,S
Heat of formation from (O)		-256	-393	-195	-65	-142	-88	-228
standard components (S)				-39	-23		-48	
Cosmic abundance (c.a.u.)		46	$9x10^4$	$9x10^5$	$9x10^5$	$1x10^4$	1500	2300
Terrestrial abundance (ppm)								
Igneous		18.5	79500	42200	42200	198	80.0	4830
Shale		22.8	80100	38800	38800	423	130	4440
Sandstone		5.9	32100	18600	18600	120	16.3	1950
Carbonate		2.7	8970	8190	8190	7.1	15.6	377
Evaporite		--	29	265	265	10.6	0.6	4.2

c.a.u. = cosmic abundance units (Goles, 1969). * L = Lithophile, S = Siderophile, C = Chalcophile. Data from Heydemann (1969), Whittaker and Muntus (1970), Horn and Adams (1966), Goles (1969) and Vlasov (1966).

TABLE 2

POSSIBLE INTERFERING LINES IN THE DETERMINATION OF Ga BY XRF

Element	Line	Order	Intensity	$^{o}2\theta$ LiF(200)
W	$L\beta_1$	1	50	37.12 *
Ta	$L\beta_2$	1	20	37.21 *
Zn	$K\beta_1$	1	20	37.54 ** X
Hf	$L\beta_5$	1	.1	37.60 **
W	$L\beta_4$	1	4	37.72 *
Th	$L\gamma_1$	2	10	37.84
Ta	$L\beta_3$	1	6	37.87 *
Nb	$K\beta_2$	2	5	37.90 *
Pt	$L\alpha_1$	1	100	38.05
--	-	-	-	38.05 B1 X
Hf	$L\beta_2$	1	20	38.47 **
Ta	$L\beta_1$	1	50	38.47 *
Nb	$K\beta_1$	2	18	38.56 *
Ba	$K\beta_2$	4	7	38.61 *
Nb	$K\beta_3$	2	7	38.62 *
Ga	$K\alpha_{1,2}$	1	150	38.90 ** X
Ta	$L\beta_4$	1	4	39.04 *
Pb	L_L	1	3	39.16 *
Ir	$L\alpha_1$	1	100	39.22
Hf	$L\beta_3$	1	6	39.25 **
--	-	-	-	39.40 B2 X
Ba	$K\beta_1$	4	21	39.59 *
--	-	-	-	39.60 (B2)
Ba	$K\beta_3$	4	7	39.71 *
Hf	$L\beta_1$	1	50	39.89 ** X
Zr	$K\beta_2$	2	4	40.07 *
Tl	L_L	1	3	40.22
Os	$L\alpha_1$	1	100	40.40
Cu	$K\beta_1$	1	20	40.44 ** X
Hf	$L\beta_4$	1	4	40.43 **
Zr	$K\beta_1$	2	18	40.74 *

Other possible interfering elements are: Er, Ho and Lu. ** Interferences for which corrections were made. * Interferences which were investigated but for which no corrections were made. X Angles at which measurements were made. Data are taken from White and Johnson (1970).

TABLE 3

INTERFERENCES CAUSED BY SOME ELEMENTS IN THE DETERMINATION OF Ga, Zn, Hf AND Cu IN THE XRF METHOD USED IN THIS WORK

Sample	(1) ppm Ga Conventional background	(2) ppm Ga 1/m.a.c. background	ppm Ga (1) Pb corrected	ppm Ga (2) Pb corrected	ppm Zn	ppm Hf	ppm Cu
					Conventional backgrounds		
1110 ppm Pb	6.8	14.7	0.0	0.0	-54	-27.1	-40
54 ppm Pb	0.3*	0.9	0.0	0.2*	<7	<4.0	~ 8
6350 ppm Ba	-0.4	1.0	-	-	<7	<4.0	11
335 ppm W	-0.5	0.2*	-	-	59	<4.0	<8
230 ppm Ta	2.8	-	-	-	<9	-12.0	<10
2100 ppm Nb	0.1*	-	-	-	<7	<4.0	<8
2400 ppm Zr	0.0	-	-	-	<7	<4.0	11
2000 ppm Th	-0.3*	-	-	-	<5	<4	<7

* D.L. for Ga = 0.4 ppm; D.L. for Zn = 7-9 ppm; D.L. for Hf = 4.0 ppm; D.L. for Cu = 8-10 ppm.

Pb interferences on Ga as calculated from the 1110 ppm Pb sample, give 6.8/1110 = 0.0061 ppm Ga/ppm Pb for the conventional background method, and 14.7/1110 = 0.0132 ppm Ga/ppm Pb for the 1/m.a.c. background method.

TABLE 4

INSTRUMENTAL VARIABLES USING A PHILIPS PW1220 XRF SPECTROMETER

Tube	Mo						
kV	80						
mA	25						
Crystal	LiF(200)						LiF(220)
Collimator	Fine(150μm)						
Detector	F + S						
Vacuum	Yes						
Peaks	Zn K_β	B_1	Ga K_α	B_2	Hf L_{β_1}	Cu K_β	Mo K_α Compton
$^o2\theta$	37.54	38.05	38.90	39.40	38.89	40.44	29.88
Counting Time (Secs)	60-200	60-400	120-600	60-400	60-400	60-200	400,000 counts

TABLE 5

SETS OF COUNTING TIMES USED IN THIS WORK FOR THE DETERMINATION OF Ga, TOGETHER WITH APPROXIMATE DETECTION LIMITS

Code	Zn Kβ	B1	Ga Kα	B2	Hf Lβ_1	Cu Kβ	Total Time Mins.
240	60	60	120	60	60	60	7
400	100	100	200	100	100	100	12
480	60	120	240	120	120	60	12
800	100	200	400	200	200	100	20
1080	120	240	600	240	240	120	26
1400	200	400	600	400	400	200	37
80 (testing)	20	20	40	20	20	20	2½

All counting times in seconds.

APPROXIMATE DETECTION LIMITS IN PPM FOR VARIOUS COUNTING TIME CODES

Code	Zn	Ga	Hf	Cu
240	10	0.7	6	10
400	9	0.5	5	9
480	9	0.5	5	9
800	8	0.4	4	8
1080	7	0.4	4	7
1400	6	0.3	3	6

TABLE 6

COUNTING ERRORS AND DETECTION LIMITS FOR Ga USING VARIOUS COUNTING TIMES

Counting Time Codes		240		400		480		800		1080		1400	
Sample	Gallium	Error	DTLMT	Error	DTLMT	Error	DTLMT	Error	DTLMT	Error	DTLMT	Error	DTLMT
	ppm	%	ppm	%	ppm	%	ppm	%	ppm	%	ppm	%	ppm
A-3	17.0	1.7	0.5	1.3	0.4	1.2	0.4	0.9	0.3	0.8	0.3	0.7	0.2
F-10	15.8	2.0	0.6	1.5	0.4	1.3	0.4	1.0	0.3	0.9	0.3	0.8	0.2
F-20	29.3	1.0	0.5	0.8	0.4	0.7	0.4	0.5	0.3	0.5	0.2	0.4	0.2
W-1	16.3	2.2	0.7	1.7	0.5	1.5	0.5	1.2	0.4	1.0	0.3	0.9	0.3
NIM-N	15.6	2.2	0.7	1.7	0.5	1.5	0.4	1.2	0.3	1.0	0.3	0.9	0.2
G-133	13.6	2.8	0.7	2.1	0.5	1.9	0.5	1.5	0.4	1.3	0.3	1.1	0.3
G-121	10.6	3.4	0.7	2.7	0.5	2.4	0.5	1.9	0.4	1.6	0.3	1.4	0.3
LB-4	8.0	4.2	0.6	3.2	0.5	2.9	0.4	2.3	0.3	1.9	0.3	1.7	0.2
LB-2	6.1	5.5	0.7	4.2	0.5	3.9	0.4	3.0	0.3	2.6	0.3	2.3	0.2
LB-54	4.6	7.0	0.6	5.4	0.5	5.0	0.4	3.8	0.3	3.3	0.3	2.9	0.2
Pyx ME-7	2.7	14.7	0.8	11.3	0.6	10.3	0.5	8.0	0.4	6.9	0.4	6.1	0.3
PCC-1	0.5	47.6	0.5	38.1	0.4	33.6	0.4	26.0	0.3	22.5	0.2	17.4	0.2
DTS-1	-0.4	-67.0	0.6	-51.9	0.4	-47.4	0.4	-36.7	0.3	-31.8	0.3	-28.0	0.2

All samples counted using times for code 80 (testing) (Table 5). The underlined figures indicate the code used to select the counting times for the accurate determination of Ga in each sample.

TABLE 7

LINE INTERFERENCES AT PEAK AND BACKGROUND POSITIONS AS PERCENTAGES OF THE MEASURED PEAK INTENSITIES FOR Zn, Ga, Hf AND Cu

Interfering Element	Position	% of Main Peak
Zn	B1	4.9
Ga	B1	0.9
Ga	B2	4.9
Ga	Hf	0.4
Hf	Zn	0.6
Hf	B1	3.9
Hf	Ga	5.5
Hf	B2	16.1
Hf	Cu	17.0
Cu	B2	0.4
Cu	Hf	3.4

TABLE 8

RELATIONSHIP BETWEEN Mo K_α COMPTON TIME AND CALCULATED m.a.c's

USING VARIOUS DATA TABLES

Mass Absorption Coefficients	Av. R.S.D. (%)	Max. Error (%)	Intercept on m.a.c. Axis
Heinrich (1966) calc.	1.36	3.97	1.03
Dewey (1967) calc.	1.49	4.42	0.44
Philips (1962) calc.	1.55	4.01	0.15
Birks (1959) calc.	1.80	4.43	-0.33
Birks (1972) calc.	1.80	5.16	-0.65
Measured (transmission) method	0.82	1.91	-0.00

Note: Maximum errors and average R.S.D. are calculated using residuals from a reduced major axis regression line (which assumes errors in X and Y) fitted to the data points. Times for 400,000 counts were measured using a Y_2O_3 filter.

TABLE 9

MASS ABSORPTION COEFFICIENTS MEASURED AT DIFFERENT WAVELENGTHS BY THE TRANSMISSION METHOD, AND THEIR RATIOS

Wavelength Å	0.93	0.88	0.79	0.75	0.49						
Sample	μ_{Rb}	μ_{Sr}	μ_{Zr}	μ_{Nb}	μ_{Sn}	μ_{Nb}/μ_{Rb}	μ_{Nb}/μ_{Sr}	μ_{Nb}/μ_{Zr}	μ_{Nb}/μ_{Sn}	μ_{Sr}/μ_{Rb}	μ_{Sr}/μ_{Zr}
PG-11	10.04	8.599	6.335	5.493	---	0.547	0.639	0.867	---	0.857	1.357
G-1	10.10	8.662	6.373	5.544	---	0.549	0.640	0.870	---	0.858	1.359
PCC-1	11.28	9.681	7.137	6.194	---	0.549	0.640	0.868	---	0.858	1.356
DTS-1	11.62	9.995	7.368	6.385	---	0.549	0.639	0.867	---	0.860	1.357
OK-272	12.34	10.61	7.825	6.796	---	0.551	0.641	0.869	---	0.860	1.356
M-38	12.45	10.76	7.969	6.940	---	0.557	0.645	0.871	---	0.864	1.350
GSB	12.78	10.97	8.062	6.986	---	0.547	0.636	0.866	---	0.858	1.361
KL-11	15.19	13.11	9.704	8.464	2.560	0.557	0.646	0.872	3.306	0.863	1.351
W-1	15.39	13.22	9.815	8.548	2.564	0.555	0.647	0.871	3.334	0.859	1.347
BCR-1	15.96	---	---	8.972	2.697	0.562	---	---	3.327	---	---
MRG-1	19.67	17.05	12.64	11.01	3.307	0.560	0.646	0.871	3.329	0.867	1.349
TiO_2	30.09	26.00	19.24	16.71	4.989	0.555	0.643	0.868	3.349	0.864	1.351
NIM-L	14.76	12.71	9.400	8.611	3.002	<u>0.584</u>	<u>0.678</u>	<u>0.916</u>	<u>2.868</u>	0.861	1.352
Mean (excluding NIM-L)						0.553	0.642	0.869	3.329	0.861	1.354
Range ±						0.009	0.006	0.003	0.023	0.006	0.007
Range as % of mean ±						1.63	0.94	0.35	0.69	0.70	0.52
TiO_2/PG-11	3.00	3.02	3.04	3.04	Mean = 3.03 ± 0.03 or ± 1.0%						
MRG-1/G-1	1.95	1.97	1.98	1.99	Mean = 1.97 ± 0.02 or ± 1.0%						

Sample NIM-L shows deviations (underlined) due to high concentrations of Nb, Zr, Y and Sr present (i.e. absorption edges lie within the wavelength range being examined).

TABLE 10

COMPARISON OF MoKα COMPTON PEAK MASS ABSORPTION COEFFICIENTS DETERMINED DURING A GALLIUM RUN (NO FILTER) WITH THOSE DETERMINED FOR THE SAME SAMPLES USING A Y_2O_3 FILTER

Mass absorption coefficients are for the Rb Kα wavelength.

Sample	Y_2O_3 Filter	No Filter	% Difference
W-1	15.42	15.36	-0.4
G-1	10.13	10.18	+0.5
MRG-1	19.70	19.66	-0.2
Knippa	17.25	17.27	+0.1
Olivine	11.61	11.69	+0.7
EG 4489	14.08	13.94	-1.0
NIM-G	9.81	9.85	+0.4
Chassigny	20.68	20.78	+0.5
Bondoc	15.89	15.83	-0.4
Mt. Padbury	21.19	21.12	-0.3
Estherville	17.28	17.35	+0.4
Patwar	24.52	24.14	-1.5
G-2	10.53	10.64	+1.0
BCR-1	16.18	16.31	+0.8
Mean difference without regard to sign			0.6%
Mean difference			+0.04%

TABLE 11

TABLE INDICATING THE MAGNITUDES OF PEAK INTERFERENCE CORRECTIONS, IN COUNTS/SEC AND AS PERCENTAGES OF NETT INTENSITIES, FOR THREE ROCKS

Sample	Element	Nett Intensity	Correction on various positions in c.p.s.						Total Correction	
			Zn	B1	Ga	B2	Hf	Cu	c.p.s.	% of nett intensity
W-1	Zn	82.0	-	4.0	-	-	-	-	0.0	0.0
	B1	402.5	-	-	-	-	-	-	5.1	1.3
	Ga	112.5	-	1.0	-	5.5	0.5	-	0.2	0.2
	B2	348.4	-	-	-	-	-	-	6.3	1.8
	Hf	3.3	0.0	0.1	0.2	0.5	-	0.6	3.4	103.0
	Cu	84.1	-	-	-	0.3	2.9	-	0.6	0.7
GSP-1	Zn	129.1	-	6.3	-	-	-	-	0.1	0.1
	B1	501.5	-	-	-	-	-	-	9.0	1.8
	Ga	191.7	-	1.7	-	9.4	0.8	-	1.4	0.7
	B2	434.2	-	-	-	-	-	-	13.5	3.1
	Hf	24.6	0.1	1.0	1.4	4.0	-	4.2	1.9	7.7
	Cu	32.5	-	-	-	0.1	1.1	-	4.2	12.9
EG-4489	Zn	337.6	-	16.5	-	-	-	-	0.4	0.1
	B1	437.6	-	-	-	-	-	-	21.3	4.9
	Ga	250.4	-	2.3	-	12.3	1.0	-	3.6	1.4
	B2	379.0	-	-	-	-	-	-	23.3	6.1
	Hf	65.2	0.4	2.5	3.6	10.5	-	11.1	5.5	8.4
	Cu	133.2	-	-	-	0.5	4.5	-	11.1	8.3

Error on Ga if no corrections were made: for W-1, error = 5.4 c.p.s. or 4.8%; for GSP-1, error = 9.7 c.p.s. or 5.0%; for EG-4489, error = 18.3 c.p.s. or 7.3%. Note that most of the interference is on B1 and B2 and not on the Ga peak itself.

TABLE 12A

Ga CONCENTRATIONS DETERMINED BY XRF SPECTROMETRY IN SOME STANDARD ROCKS AND MINERALS

TOGETHER WITH RECOMMENDED AND PREFERRED VALUES

Sample	ppm Ga Conventional background (1)	ppm Ga 1/m.a.c. background (2)	ppm Ga (1) Pb corrected	ppm Ga (2) Pb corrected	"Preferred" Average Values (This work)	Recommended Values** ppm	de Laeter (1972) ppm
W-1	16.5	16.5	16.5	16.5	16.8	16.0*	15.9
G-1	19.0	19.0	18.7	18.4	18.5	19.6*	19.6
G-2	21.4	22.2	21.2	21.8	21.2	22.9*	22.9
GSP-1	21.3	22.4	21.0	21.6	20.2	22^{+}	22.3
AGV-1	19.6	20.4	19.4	19.9	19.5	20.5*	20.5
BCR-1	21.0	21.1	20.9	20.9	21.9	20^{+}	19.8
PCC-1	0.6	< 0.3	0.6	< 0.3	0.5	0.4^{+}	0.4
DTS-1	0.4	< 0.3	0.4	< 0.3	0.3	0.2^{+}	0.2
GA	14.8	14.4	14.6	14.0		16*	
GH	21.9	21.6	21.6	21.0		23*	
GR	19.5	19.6	19.3	19.2		20*	
BR	16.2	17.6	16.1	17.5		20*	
JG-1	15.6	15.4	15.4	15.1		20^{+}	
JB-1	16.7	17.2	16.6	17.0		17^{+}	
NIM-D	0.8	1.3	0.8	1.3		1.3^{+}	
NIM-G	26.8	26.5	26.6	26.0		27*	
NIM-L	52.4	56.2	52.0	55.3		54?*	
NIM-N	16.2	16.2	16.2	16.1		16*	

Contd.

TABLE 12B

Sample	ppm Ga Conventional background	ppm Ga 1/m.a.c. background	ppm Ga (1) Pb corrected	ppm Ga (2) Pb corrected	"Preferred" Average Values (This work)	Recommended Values** ppm	de Laeter (1972) ppm
NIM-P	6.5	6.9	6.5	6.9		8?*	
NIM-S	10.8	10.9	10.8	10.8		11*	
MRG-1	16.7	17.5	16.7	17.4			
USBS-99A	15.5	15.5	15.1	14.7			
NBS-70A	18.2	18.1	-	-			17.1
T-1	18.5	18.7	18.3	18.2		21^{++}	18.8
Knippa basalt	18.6	20.5	18.5	20.4			
SY-1	22.2	26.8	19.7	20.2		20	
SY-2	26.8	28.1	26.3	26.9			24.7
SY-3	25.3	29.7	24.5	27.9			25.6

All values from this work based on W-1 = 16.5 ppm Ga. Pb correction on Ga for (1) = -0.0061 ppm Ga/ppm Pb. Pb correction on Ga for (2) = -0.0132 ppm Ga/ppm Pb. The de Laeter (1972) values were determined by isotope dilution analysis. ** Recommended values from Flanagan (1973), Steele et al. (1978) and Govindaraju and de la Roche (1977). * Recommended values. $^{+}$ = magnitudes. All other values are averages. $^{++}$ = Average value taken from report by Geological Survey Division, Tanzania (1963). N.B. Recommended values from this work are the Pb corrected (1) values in column three. The detection limit for Ga is 0.3 ppm, so that DTS-1 is just detectable by the conventional background method, while PCC-1 is at twice the detection limit. See Table 15 for individual determinations on all samples. "Preferred" Average values (this work): Average values calculated from literature data (see text and Table 14).

TABLE 13

SUMMARY OF DATA PLOTTED IN FIGS. 17-19 FOR U.S.G.S. STANDARD ROCKS

	G-1	W-1	G-2	GSP-1	AGV-1	BCR-1	PCC-1	DTS-1
Number of determinations	45	58	34	32	31	39	5	5
Mean	18.7	17.3	21.8	20.2	19.6	22.2	0.5	0.3
s.d.(1s)	4.2	5.1	4.9	5.3	4.4	4.2	0.2	0.2
Range ($\pm$ 1s)	14.5 22.9	12.2 22.4	16.9 26.7	14.9 25.5	15.2 24.0	18.0 26.4	0.3 0.7	0.1 0.5
Number of determinations rejected	5	9	5	5	4	5	0	0
Number of determinations accepted	40 (89%)	49 (84%)	29 (85%)	27 (84%)	27 (87%)	34 (87%)	5 (100%)	5 (100%)
New mean	18.6	16.9	21.0	20.2	19.4	21.9	-	-
s.d.(1s)	2.2	2.3	3.3	3.4	3.1	2.6	-	-
"Preferred average"	18.6	16.9	21.0	20.2	19.4	21.9	0.5	0.3

Note: The number of determinations excluded from the calculation of the new means was a compromise between rejecting those samples lying outside the range of $\pm$ 1 s.d. of the mean of all determinations and rejecting the 15% of the data points lying farthest from this mean value for each standard. The actual distribution of the data points in Figs 17-19 was also taken into consideration when deciding on which data points should be rejected. For PCC-1 and DTS-1 only reported data less than 1 ppm Ga were considered in calculating the mean values and none of this data was rejected.

TABLE 14

COMPARISON OF Ga VALUES FOR U.S.G.S. STANDARD ROCKS DETERMINED IN THIS WORK WITH "PREFERRED AVERAGES" OR "USABLE VALUES" CALCULATED FROM DATA REPORTED IN THE LITERATURE

Standard	"Preferred averages or usable values"				This work
	This work	Steele	Abbey	Mean	
G-1	18.6(5)	18.4(4)	18.5(9)	18.5	18.7
W-1	16.9(9)	16.7(11)	16.9(11)	16.8	16.5
G-2	21.0(5)	21.2(4)	21.4(7)	21.2	21.2
GSP-1	20.2(5)	19.9(4)	20.4(6)	20.2	21.0
BCR-1	21.9(5)	21.9(3)	21.8(8)	21.9	20.9
AGV-1	19.4(4)	19.2(3)	19.8(6)	19.5	19.4
PCC-1	0.5	--	--	0.5	0.6
DTS-1	0.3	--	--	0.3	0.4

All values in ppm Ga. The figures in brackets indicate the number of determinations rejected before calculating the preferred averages or usable values. Total number of determinations used in the calculations are given in Table 13. The values under headings Steele and Abbey have been calculated using the criteria described by these authors (see text).

TABLE 15A.

GALLIUM IN STANDARD ROCKS AND MINERALS.

SAMPLE NAME		PPM GA	GA DTLM	GA ERROR PPM	GA ERROR %	PPM GA						SIGMA
W-1 (1)	APRIL, 1973	16.6	.4	.12	.7	16.99	16.42	16.50				2.7
W-1 (2)	APRIL, 1973	16.4	.4	.09	.6	16.65	16.07	16.56	16.35	16.20		2.8
W-1 (1)	SEPT., 1973	16.5	.4	.09	.5	16.51	16.47	16.56	16.54	16.37	16.60	1.1
W-1 (3)	SEPT., 1973	16.5	.4	.09	.5	16.49	16.48	16.44	16.45	16.48	16.33	.4
W-1 (1)	FEB., 1974	16.5	.4	.09	.5	16.40	16.53	16.37	16.54	16.49	16.62	1.2
W-1 (3)	FEB., 1974	16.5	.4	.09	.5	16.51	16.48	16.49	16.52	16.51	16.53	.2
W-1 (1)	OCT., 1974	16.5	.4	.09	.6	16.73	16.35	16.55	16.47	16.37		1.8
W-1 (3)	OCT., 1974	16.4	.4	.15	.9	16.41	16.41					.0
W-1 (1)	APRIL, 1976	16.5	.5	.12	.7	16.22	16.56	16.20	16.63	17.05		3.3
G-1 (1)	APRIL, 1973	18.9	.3	.09	.5	18.82	18.71	19.10				2.4
G-1 (2)	APRIL, 1973	19.0	.3	.07	.4	19.12	19.11	18.92	18.96	19.05		1.2
G-1 (1)	SEPT., 1973	19.0	.3	.07	.3	18.79	18.82	18.99	19.16	19.18	19.27	3.0
G-1 (1)	FEB., 1974	19.0	.3	.07	.3	18.90	19.03	18.68	19.16	19.17	19.10	3.1
G-1 (1)	OCT., 1974	19.0	.3	.07	.3	18.93	19.00	19.17	19.06	18.90	18.97	1.7
G-1 (1)	APRIL, 1976	19.0	.4	.09	.5	19.05	19.30	18.94	18.74	18.83		2.8
G-2 (1)	APRIL, 1973	21.7	.4	.10	.5	21.65	22.07	21.42				3.8
G-2 (2)	APRIL, 1973	20.9	.4	.10	.5	21.05	20.58	20.94				2.8
G-2 (1)	SEPT., 1973	21.9	.4	.12	.5	21.72	22.02					1.8
G-2 (1)	FEB., 1974	21.1	.4	.12	.6	21.18	21.09					.5
G-2 (1)	OCT., 1974	21.5	.4	.12	.6	21.29	21.74					2.6
GSP-1 (1)	APRIL, 1973	21.2	.4	.10	.5	20.96	21.48	21.16				2.9
GSP-1 (2)	APRIL, 1973	21.3	.4	.10	.5	21.22	21.20	21.35				.8
GSP-1 (1)	SEPT., 1973	21.4	.4	.13	.6	21.45	21.42					.2

TABLE 158.

GALLIUM IN STANDARD ROCKS AND MINERALS.

SAMPLE	NAME	PPM GA	GA DTLM	GA ERROR PPM	GA ERROR %	PPM GA				SIGMA
AGV-1	(1) APRIL, 1973	19.7	.4	.11	.6	19.91	19.33	19.81		3.1
AGV-1	(2) APRIL, 1973	19.6	.4	.11	.6	19.78	19.48	19.65		1.6
AGV-1	(1) SEPT., 1973	19.8	.4	.13	.7	19.70	19.83			.7
AGV-1	(1) FEB., 1974	19.4	.4	.13	.7	19.37	19.40			.2
BCR-1	(1) APRIL, 1973	21.0	.4	.13	.6	20.92	20.99	20.98		.3
BCR-1	(2) APRIL, 1973	20.6	.4	.13	.6	20.24	20.63	20.82		2.5
BCR-1	(1) SEPT., 1973	20.9	.4	.16	.8	20.88	20.91			.1
BCR-1	(1) FEB., 1974	21.4	.4	.16	.8	21.20	21.51			1.3
BCR-1	(1) OCT., 1974	20.9	.4	.16	.8	21.02	20.85			.7
PCC-1	(1) APRIL, 1973	.7	.3	.08	12.9	.56	.76			1.7
PCC-1	(2) APRIL, 1973	.5	.3	.08	16.2	.50	.55			.4
PCC-1	(1) SEPT., 1973	.5	.3	.06	12.1	.55	.58	.43	.43	1.2
PCC-1	(1) FEB., 1974	.6	.3	.08	14.0	.49	.72			1.9
PCC-1	(2) FEB., 1974	.6	.3	.08	13.7	.76	.48			2.3
DTS-1	(1) APRIL, 1973	.3	.3	.08	24.6	.41	.28			1.1
DTS-1	(2) APRIL, 1973	.4	.3	.08	22.3	.54	.22			2.7
DTS-1	(1) SEPT., 1973	.4	.3	.08	19.3	.32	.56			2.0
DTS-1	(1) FEB., 1974	.4	.3	.08	21.2	.54	.26			2.3
DTS-1	(2) FEB., 1974	< .3	.3			.16	.34			

TABLE 15C.

GALLIUM IN STANDARD ROCKS AND MINERALS.

SAMPLE	NAME	PPM GA	GA DTLM	GA ERROR PPM	GA ERROR %	PPM GA	SIGMA
GA	APRIL, 1973	14.8	.3	.09	.6	14.97 14.84 14.52	2.8
GH	APRIL, 1973	21.9	.3	.09	.4	22.18 21.70 21.71	3.0
GR	APRIL, 1973	19.5	.3	.10	.5	19.46 19.51 19.46	.3
BR	APRIL, 1973	16.2	.5	.13	.8	16.29 16.20 16.07	1.0
JG-1	APRIL, 1973	15.6	.3	.09	.6	15.74 15.46 15.49	1.7
JB-1	APRIL, 1973	16.7	.4	.12	.7	16.69 17.07 16.41	3.3
NIM-D (1)	APRIL, 1973	.8	.4	.14	17.9	.78 .80	.1
NIM-D (2)	APRIL, 1973	.7	.4	.14	20.1	.78 .63	.7
NIM-G (1)	APRIL, 1973	27.0	.3	.11	.4	27.07 27.01	.4
NIM-G (2)	APRIL, 1973	26.8	.3	.11	.4	26.66 26.98	2.0
NIM-G (1)	SEPT., 1973	26.9	.3	.11	.4	26.96 26.76	1.3
NIM-G (1)	FEB., 1974	27.1	.3	.11	.4	27.02 27.20	1.1
NIM-G (3)	FEB., 1974	26.4	.3	.11	.4	26.58 26.29	1.8
NIM-G (1)	OCT., 1974	27.1	.3	.11	.4	27.26 26.97	1.8
NIM-L (1)	APRIL, 1973	52.3	.4	.18	.3	52.46 52.22	1.0
NIM-L (2)	APRIL, 1973	53.1	.4	.14	.3	53.43 52.56 53.40	3.5
NIM-L (1)	FEB., 1974	52.1	.4	.11	.2	51.23 51.73 51.94 52.63 53.19	7.8
NIM-L (1)	OCT., 1974	52.0	.4	.14	.3	51.48 51.94 52.64	4.6

TABLE 15D.

GALLIUM IN STANDARD ROCKS AND MINERALS.

SAMPLE NAME		PPM GA	GA DTLM	GA ERROR PPM	GA ERROR %	PPM GA				SIGMA
NIM-N (1)	APRIL, 1973	16.0	.4	.14	.9	16.13	15.88			1.3
NIM-N (2)	APRIL, 1973	16.3	.4	.14	.9	16.05	16.50			2.3
NIM-P (1)	APRIL, 1973	6.3	.4	.14	2.2	6.44	6.15			1.5
NIM-P (2)	APRIL, 1973	6.7	.4	.14	2.1	6.73	6.63			.5
NIM-S (1)	APRIL, 1973	10.6	.4	.12	1.1	10.70	10.40			1.8
NIM-S (2)	APRIL, 1973	11.1	.4	.12	1.1	11.14	11.09			.3
S-1	APRIL, 1973	22.2	.4	.13	.6	22.39	22.35	21.75		2.9
S-2	APRIL, 1973	26.8	.4	.12	.4	26.92	26.59	26.89		1.7
S-3	APRIL, 1973	25.3	.4	.12	.5	25.09	25.16	25.56		2.2
T-1	APRIL, 1973	18.5	.4	.09	.5	18.51	18.40	18.46	18.48	.6
USBS 99A	APRIL, 1973	15.5	.3	.11	.7	15.56	15.49			.5
NBS 70A	APRIL, 1973	18.2	.3	.11	.6	18.44	17.94			3.1
MRG-1 (1)	APRIL, 1973	16.4	.5	.18	1.1	16.41	16.48			.3
MRG-1 (2)	APRIL, 1973	16.7	.5	.15	.9	16.50	17.10	16.44		2.5
MRG-1 (3)	OCT., 1974	16.9	.5	.18	1.1	16.67	17.15			1.8

TABLE 15E.

GALLIUM IN STANDARD ROCKS AND MINERALS.

SAMPLE NAME	PPM GA	GA DTLM	GA ERROR PPM	GA ERROR %	PPM GA	SIGMA
KNIPPA (1) APRIL, 1973	18.5	.5	.14	.8	18.42 18.08 18.90	3.3
KNIPPA (1) OCT., 1974	18.7	.5	.18	.9	18.53 18.87	1.4
KNIPPA (2) APRIL, 1973	19.0	.5	.18	.9	18.72 19.25	2.1
KNIPPA (2) OCT., 1974	18.4	.5	.18	1.0	18.34 18.41	.3
BHVO 22/16	20.6	.4	.16	.8	20.60 20.50	.4
BHVO 50/1	20.2	.4	.16	.8	20.40 20.00	1.7
BHVO 59/6	20.6	.5	.16	.8	20.50 20.60	.4

TABLE 16

CONCENTRATIONS OF Zn IN SOME STANDARD ROCKS DETERMINED USING THE ZnKβ LINE DURING THE DETERMINATION OF Ga

Sample	This work ppm	Flanagan (1973) ppm	Steele et al.(1978) ppm
G-1	46	45*	
W-1	84	86*	
G-2	83	85*	
GSP-1	100	98*	
AGV-1	86	84*	
BCR-1	124	120*	
PCC-1	41	36*	
DTS-1	43	45*	
NIM-D	89	90	90*
NIM-G	44	60	50*
NIM-L	446	320+	395*
NIM-N	57	80	68*
NIM-P	105	100	100*
NIM-S	< 7	21	10?
GA	98	75*	
GH	99	80*	
GR	79	60*	
BR	160	160*	
T-1	180		
JG-1	37		
JB-1	86		
MRG-1	210		
Knippa basalt	134		

G-1 and W-1 used as reference standards. s.d. of this method = 2-3 ppm ($1s_c$). D.L. = 6-10 ppm. * = recommended value. + = magnitude. Other values under Flanagan are averages.

TABLE 17

CONCENTRATIONS OF Cu IN SOME STANDARD ROCKS DETERMINED USING THE CuKβ LINE DURING THE DETERMINATION OF Ga

Sample	This work ppm	Flanagan (1973) ppm	Steele et al.(1978) ppm
G-1	12	13*	
W-1	110	110*	
G-2	8	12	
GSP-1	32	33	
AGV-1	59	60	
BCR-1	20	18	
PCC-1	13	11	
DTS-1	11	7	
NIM-D	17	8	10*
NIM-G	13	15	12*
NIM-L	<11	15	13*
NIM-N	15	13	14*
NIM-P	24	17	18*
NIM-S	19	23	19*
GA	14	14*	
GH	11	12*	
GR	380	345*	
BR	78	70*	
T-1	44		
JG-1	<8	3.3+	
JB-1	52	52	
MRG-1	134		
Knippa basalt	67		

G-1 and W-1 used as reference standards. s.d. of this method = 2-3 ppm ($1s_c$). D.L. = 6-10 ppm. * = recommended values. + = magnitudes. Other values under Flanagan are averages.

TABLE 18

CONCENTRATIONS OF Hf IN SOME STANDARD ROCKS DETERMINED USING THE $HfL_{\beta 1}$ LINE DURING THE DETERMINATION OF Ga

Sample	This work	Flanagan (1973)	Univ. Oregon*	Fesq et al. (1972)	Steele et al. (1978)
	ppm	ppm	ppm	ppm	ppm
G-1	5.8	5.2			
W-1	<3.8	2.7	2.5	2.5	
G-2	7.6	7.4		7.4	
GSP-1	15.4	15.9	12-15	14	
AGV-1	4.5	5.2	5.0		
BCR-1	4.5	4.7	4.5-5.0	4.8	
NIM-G	12.0	12^{+}			12.1
NIM-L	277	250^{+}			202

Best fit working curve through USGS standards used to derive values.

$^{+}$ = magnitudes. Other values under Flanagan are averages.

s.d. = 0.4-0.6 ppm ($1s_c$). D.L. = 3.4-3.8 ppm. * A.R. Duncan (pers. comm.).

KEY TO SOURCES OF DATA IN TABLES 19-25, 27-29

(1) Fouche and Smales (1967)

(2) Rieder and Wanke (1969)

(3) Schaudy et al. (1968)

(4) Case et al. (1969)

(5) Greenland (1965)

(6) Case et al. (1973)

(7) Baedecker et al. (1972)

(8) Baedecker and Wasson (1975)

(9) Chou et al. (1976a)

(10) Clarke et al. (1970)

(11) Ikramuddin et al. (1975)

(12) Onishi and Sandell (1956)

(13) Chou et al. (1973)

(14) Laul et al. (1970)

(15) Schaudy et al. (1967)

(16) Tandon and Wasson (1968)

(17) Chou and Cohen (1973)

(18) Mason and Graham (1970)

(19) Keays et al. (1971)

(20) Binz et al. (1974)

(21) de Laeter (1972)

(22) Ikramuddin et al. (1976)

(23) Laul et al. (1972)

(24) Wasson and Baedecker (1970)

(25) Wanke et al. (1972b)

(26) Wasson et al. (1976)

(27) Binz et al. (1975)

(28) Chou et al. (1976b)

(29) Hecht and Fenninger (1965)

(30) Binz et al. (1976)

(31) Ikramuddin et al. (1977)

(32) Moss et al. (1967)

(33) Allen and Mason (1973)

(34) Cobb and Moran (1965)

(35) Wanke et al. (1970)

(36) Rambaldi (1976)

(37) Bauer and Schaudy (1970)

(38) Lovering et al. (1957)

(39) Wasson et al. (1974)

(40) Baedecker and Wasson (1970)

TABLE 19

COMPARATIVE DATA ON GALLIUM IN INDIVIDUAL CARBONACEOUS CHONDRITE METEORITES

Source:	This work	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample								
C2								
Cold Bokkeveld	7.8	8.1					7.2	
Mighei	7.7	8.2				10.4	7.7	
Murray	7.7		7.8		6.4	9.6	6.4	
C3-O								
Felix	6.8					10.6	6.4	
Lancé	6.6	6.8	6.8			10.4	8.1	
Warrenton	7.6					10.6	7.5	
C3-V								
Allende	5.6							
Allende USNM	5.7							6.0
Mokoia	5.4					6.8		
Vigarano	4.9		5.6	2.5		6.0	4.9	

(8) Allende 5.6; (9) Allende 5.9 (USNM); (10) Allende 7; (11) Allende 6.3

All data in ppm.

TABLE 20

COMPARATIVE DATA ON GALLIUM IN INDIVIDUAL BRONZITE (H-GROUP) CHONDRITE METEORITES

Source:	This work	(1)	(2)	(3)	(12)	(5)	(13)	(6)	(14)
Sample									
Kesen	5.3						5.9*		
Allegan	5.0						6.1*		
Forest City	4.9	5.2		4.6			5.6*		
Pantar	5.5		5.3			4.0			
Plainview	4.9				5.4			4.6	4.6
Pultusk	5.6		5.8	5.4			6.0*		
Beardsley	9.8		5.5						
Allegan N.M.	3.4						3.6		
Forest City N.M.	3.3						3.9		

* Bulk analysis calculated from metal and silicate analyses, assuming proportion of silicate fraction is balance of metal fraction.

N.M. = non-magnetic fraction. All data in ppm.

TABLE 21

COMPARATIVE DATA ON GALLIUM IN INDIVIDUAL HYPERSTHENE (L-GROUP) CHONDRITE METEORITES

Source:	This work	(3)	(15)	(16)	(17)	(18)	(1)	(14)	(19)
Sample									
Bjurbole	4.8	4.3		4.8					
Farmington	4.6	4.9		5.5					5.4
Alfianello	5.6	4.1							
Holbrook	4.4		6.9	4.8				4.6	
Kyushu	5.1			5.5					
Modoc	4.7			5.4			4.7		6.3
New Concord	5.5			5.2					
St. Severin	5.1					5			
Bruderheim N.M.	4.4				5.4				
Leedey N.M.	4.4				4.7				

N.M. = non-magnetic fraction. All data in ppm.

TABLE 22

COMPARATIVE DATA ON GALLIUM IN INDIVIDUAL ENSTATITE CHONDRITE METEORITES

Source:	This work	(1)	(20)	(5)	(21)	(2)	(8)	(22)
Sample								
Abee	20.0	20.2,18.3	14	17.0,31.8	18.2		17.7	17.4
Indarch	16.6	18.2,16.8	17	18.2			16.3	
St. Marks	15.6		13				16.8	
Atlanta	9.9		10					
Hvittis	10.3		10	14.8,11.8		11.6	10.9	
Pillistfer	10.7		12	15.1				
Abee N.M.	10.8	1.0						
Hvittis N.M.	0.5					0.3		

N.M. = non-magnetic fraction. All data in ppm.

TABLE 23

COMPARATIVE DATA ON GALLIUM IN INDIVIDUAL UNEQUILIBRATED CHONDRITES, EUCRITES AND HOWARDITES

Source:	This work	(23)	(24)	(25)	(6)	(28)
Sample						
Unequilibrated Chondrites						
Ngawi	4.4				5.8	
Eucrites						
Bereba	1.2	1.45				1.7
Juvinas	1.4	1.48	1.7	2.16		1.8
Pasamonte	1.3		1.7			2.0
Sioux County	1.5	1.26	1.7			1.6
Howardites						
Binda	0.9					0.93
Frankfort	0.7	0.72				
Kapoeta	0.9		1.1	1.04		1.1
Malvern	1.2					1.3

All data in ppm.

TABLE 24

COMPARATIVE DATA ON GALLIUM IN INDIVIDUAL NAKHLITES, UREILITES, DIOGENITES AND MESOSIDERITES

Source:	This work	(23)	(26)	(27)	(3)	(28)
Sample						
Nakhlites						
El Nakhla	2.8	2.7				
Ureilites						
Goalpara	0.9		1.2	0.95		
Diogenites						
Johnstown	<0.4					0.22
Shalka	<0.4					0.13
Tatahouine	<0.4					0.16
Mesosiderites						
Vaca Muerta	6.0*				4.0	

* Calculated value. All data in ppm.

TABLE 25A

GALLIUM ABUNDANCES IN CHONDRITIC AND ACHONDRITIC METEORITES:

COMPARATIVE DATA

Meteorite Type	Number of Determinations	Number of Meteorites Analysed	Concentration Range ppm	Mean ppm	Source
Carbonaceous					
C1	2	2	9.2-10.0	9.6	(1)
	3	2	12-17	14	(5)
	2	2	8.8-10.0	9.4	(6)
	4	1	8.4-11.0	10.5	(9)
C2	2	2	8.1-8.2	8.2	(1)
	2	2	9.6-10.4	10	(5)
	1	1		7.8	(2)
	4	3	6.3-7.7	7.1	(6)
	6	3	7.7-7.8	7.8	This work
C3	2	2	6.5-6.8	6.7	(1)
	7	6	6.0-11.5	9.1	(5)
	3	3	5.3-6.8	5.9	(2)
	7	6	4.9-8.1	6.5	(6)
	27	9	4.9-8.4	6.2	This work
	2	1		3.6	This work
C3-O	5	4	6.4-8.1	7.2	(6)
	13	4	6.6-8.4	7.3	This work
C3-V	1	1		7	(10)
	1	1		2.5	(3)
	2	2	4.9-5.1	5.0	(6)
	14	5	4.9-6.0	5.3	This work
	2	1		3.6	This work
	2	1	5.6-5.6	5.6	(8)
	6	1	5.6-6.2	5.9	(9)
Bronzite (H-Group)	1	1		5.0	(21)
	1	1		4.6	(14)
	7	7	4.9-5.8	5.3	(1)
	2	2	4.0-6.2	5.1	(5)
	9	9	4.2-6.8	5.4	(12)
	9	7	4.9-5.8	5.4	(2)
	12	4	2.5-5.4	4.1	(3)
	3	3	4.3-4.6	4.5	(6)
	40	11	4.9-6.0	5.4	This work
	3	1		9.8	This work

Contd.

TABLE 25B

Meteorite Type	Number of Determinations	Number of Meteorites Analysed	Concentration Range ppm	Mean ppm	Source
Hypersthene (L-Group)					
	1	1		4.9	(29)
	5	5	4.5-8.7	6.5	(15)
	1	1		5	(18)
	2	2	4.0-4.6	4.3	(14)
	7	7	4.7-8.6	5.6	(1)
	2	2	4.0-6.6	5.2	(5)
	9	9	4.4-6.0	5.2	(12)
	39	13	3.0-8.7	4.9	(3)
	46	20	4.3-6.1	5.3	(16)
	3	3	4.3-4.4	4.4	(21)
	3	3	4.0-4.6	4.2	(6)
	55	20	4.4-6.1	5.1	This work
	16	7	5.0-6.9	5.9	(19)
Amphoterite (LL6)					
	1	1		4.6	(15)
	1	1		5	(18)
	4	2	4.5-5.1	4.8	This work
Unequilibrated					
LL3	4	4	2.9-6.0	4.6	(6)
	2	1		4.4	This work
	2	2	4.2-5.0	4.6	(30)
	2	1	4.9-5.1	5.0	(19)
L3	2	1	4.5-5.0	4.8	(19)
	4	1	5.2-6.3	5.8	(31)
	3	3	4.0-5.1	4.6	(6)
	13	6	3.6-6.2	5.2	(16)
	5	5	5.2-9.8	6.8	(30)
L4	3	3	5.7-7.4	6.5	(30)
H3	4	4	4.0-5.0	4.7	(6)
	2	2	5.9-8.4	7.2	(30)

Contd.

TABLE 25C

Meteorite Type	Number of Determinations	Number of Meteorites Analysed	Concentration Range ppm	Mean ppm	Source
Enstatites					
E4	1	1		18	(21)
	5	2	17-22	17	(1)
	3	2	17-32	22	(5)
	5	3	10-17	14	(20)
	4	2	17-20	18	This work
	8	3	12-18	16	(8)
E5	2	2	10-13	12	(20)
	2	1		16	This work
	2	1	16-17	17	(8)
E6	1	1		12	(2)
	5	2	11-13	12	(1)
	6	4	12-17	15	(5)
	4	4	10-12	11	(20)
	6	3	10-11	10	This work
	2	1		5.5	This work
	9	4	7.9-11.6	10	(8)
Eucrites					
	1	1		3.4	(15)
	1	1		2.2	(25)
	8	7	1.3-1.5	1.4	(23)
	4	4	1.6-1.7	1.7	(24)
	30	8	0.7-1.7	1.4	This work
	11	5	1.5-2.0	1.7	(28)
Howardites					
	2	2	0.9-1.1	1.0	(24)
	6	6	0.7-1.3	1.1	(23)
	24	3	0.6-1.2	0.9	This work
	16	5	0.9-1.4	1.2	(28)
Shergottites					
	1	1		16.7	(28)
	1	1		13.9	(23)

Contd.

TABLE 25D

Meteorite Type	Number of Determinations	Number of Meteorites Analysed	Concentration Range ppm	Mean ppm	Source
Aubrites					
	1	1		0.06	(23)
	7	2		< 0.2	This work
	2	1	6.2-6.4	6.3	This work
Chassignites					
	3	1	0.7-1.0	0.8	This work
Diogenites					
	11	4		< 0.4	This work
	5	3	0.13-0.23	0.17	(28)
Nakhlites					
	1	1		2.7	(23)
	4	1	2.6-2.9	2.8	This work
Ureilites					
	11	5	1.0-3.1	2.0	(26)
	6	1	0.6-1.1	0.9	This work
	6	6	1.0-5.0	3.0	(27)
	1	1		1.1	(25)
NON-MAGNETIC FRACTIONS					
Bronzite (H-Group)					
	7	7	2.5-5.5	3.8	(1)
	35	15	2.9-10.7	4.6	(13)
	9	4	3.2-4.9	3.7	This work
	1	1		2.4	(32)
Hypersthene (L-Group)					
	9	9	3.8-8.9	5.3	(1)
	3	3	3.7-4.8	4.1	(32)
	5	3	5.0-5.8	5.4	(13)
	13	12	4.0-8.9	5.8	(17)
	16	14	2.7-5.3	4.4	This work
Amphoterite (LL5)					
	1	1		5.4	(17)

Contd.

TABLE 25E

Meteorite Type	Number of Determinations	Number of Meteorites Analysed	Concentration Range ppm	Mean ppm	Source
NON-MAGNETIC FRACTIONS contd.					
Enstatite					
E4	3	2	1.0-5.2	3.7	(1)
E5	2	1	1.1-1.4	1.2	This work
E6	2	2	0.3-0.5	0.4	(1)
	1	1		0.7	(32)
	1	1		0.3	(2)
	6	1	<0.2-0.6	0.4	This work

N.B. Troilite was not removed from the non-magnetic fractions reported in "This work", but was removed from the non-magnetic fractions analysed by other workers.

TABLE 26A

SUMMARY OF GALLIUM ABUNDANCES IN INDIVIDUAL CLASSES OF STONY AND STONY-IRON METEORITES

Type	Number of Determinations	Number of Specimens Analysed	Concentration Range ppm	Mean ppm
Carbonaceous				
C1	4(7)	4(6)	8.8-10(17)	9.5(11.0)
C2	13(15)	9(11)	6.3-8.2(10.4)	7.7(8.1)
C3	39(48)	20(27)	(3.6)4.9-8.4(11.5)	6.3(6.8)
C3-O	18	8	6.4-8.4	7.3
C3-V	19(22)	9(11)	(2.5)4.9-7.0	5.5(5.0)
Chondritic				
Bronzite (H-group)	88(91)	48(49)	2.5-6.8(9.8)	5.1(5.2)
Hypersthene (L-group)	205	102	3.0-8.7	5.2
Amphoterite LL6	6	4	4.5-5.1	4.8
Unequilibrated LL3	8	7	2.9-6.0	4.6
L3	18	11	3.6-9.8	5.9
H3	2	2	5.9-8.4	7.2
Enstatite E4	23(26)	11(13)	10-22(32)	16(17)
E5	6	4	10-17	14
E6	25(33)	14(19)	(5.5)7.9-13(17)	11(11)
Achondritic				
Eucrites	55	26	0.7-2.2(3.4)	1.5(1.6)
Howardites	48	16	0.6-1.4	1.1
Aubrites	8(10)	3(4)	0.06-<0.2(6.3)	~0.1
Diogenites	16	7	0.13-0.23	0.17
Ureilites	24	13	0.6-5.0	2.3
Nakhlites	5	2	2.6-2.9	2.8
Chassignites	3	1	0.7-1.0	0.8
Shergottites	2	2	13.9-16.7	15.3
Angrite	1	1	0.4	0.4
Mesosiderites				
Sub-group 1	9	4	4.9-6.4	5.6
Sub-group 3	4(6)	2(3)	8.2-10.1(9.0)	9.2(9.1)

contd.

TABLE 26B

Type	Number of Determinations	Number of Specimens Analysed	Concentration Range ppm	Mean ppm
NON-MAGNETIC FRACTIONS				
Bronzite (H-group)	50(2)	27	2.5-8.5(10.7)	4.1(4.2)
Hypersthene (L-group)	46	41	2.7-8.9	5.1
Amphoterite (LL5)	1	1	-	5.4
Enstatite E4	3	2	1.0-5.2	3.7
E5	2	1	1.1-1.4	1.2
E6	10	5	0.2-0.7	0.4
Mesosiderite	14	7	2.0-4.9	3.4

In some cases what appear to be anomalous values have been excluded from the calculations, but are included in brackets. In the case of mesosiderite sub-group 3, Emery's classification is unknown, but as its Ga value lies between those of the other two members of this group, it has been included, in brackets, with this group. The number of specimens represents the total number of individual portions of meteorites analysed. No attempt has been made to calculate mean values for each meteorite and then average them.

TABLE 27

GALLIUM IN SEPARATED METAL PHASES OF STONY AND STONY-IRON METEORITES

Class	Number analysed	Range ppm	Mean ppm	Ref.
Metal				
H	1	21-26	24	(33)
H3	1	---	6.2	(1)
H3	3	2.4-8.9	6.3	(17)
H4-H6	3	10.0-15.0	13.0	(34)
H4-H6	7	8.5-14.6	12.1	(1)
H4-H6	14	12.4-18.0	14.6	(13,17)
H4-H6	1	---	16.0	(32)
H4-H6	1	---	18.0	(35)
L3	5	1.1-5.2	3.5	(13,17)
L3	1	---	1.6	(36)
L4-L6	31	2.0-36.9	13.9	(13,17)
L4-L6	1	---	32.0	(35)
L4-L6	7	6.3-31.5	13.0	(36)
L4-L6	3	11.0-15.0	13.0	(34)
L4-L6	9	3.4-26.0	11.4	(1)
L4-L6	3	12.0-19.0	15.0	(32)
L6	1	---	22.0	(18)
LL3	1	---	1.0	(17)
L6	1	22-24	23	(33)
LL4-LL6	7	5.4-34.1	16.6	(17)
LL6	1	---	10.0	(18)
H and L	3*	12-18	16.0	(12)
E4	2	61.0-71.0	66	(1)
E4	1	---	64	(34)
E5-E6	1	---	69	(32)
E5-E6	1	---	41	(2)
E5-E6	2	52.0-60.0	56	(1)
Mesosiderite	1	---	3.9	(37)
	1	---	19	(38)
	17	8.9-15.6	12.9	(39)
	1	---	7.0	(40)
	1	---	8.6	(40)
Eucrite	1	---	9.0	(35)
Aubrite	1	---	43.0	(35)
Ni-rich Taenite				
H4-H6	1	---	28.0	(32)
L4-L6	3	33.0-39.0	36.0	(32)

* Composite samples.

TABLE 28

GALLIUM IN SEPARATED NON-METALLIC PHASES OF STONY AND STONY-IRON METEORITES

Class	Number analysed	Range ppm	Mean ppm	Ref.
Sulphide				
H4-H6	1	---	9.0	(32)
L4-L6	3	2.0-14.0	6.0	(32)
L4-L6	1	---	6.0	(18)
L6	1	6-9	7.5	(33)
LL6	1	---	5.0	(18)
H and L	3*	9.0-14.0	11.0	(12)
H	1	1-2	1.5	(33)
E6	1	---	0.0	(32)
E6	1	---	1.0	(33)
Non-magnetic (silicate + sulphide)				
H3	1	---	5.5	(1)
H4-H6	4	3.3-4.6	3.7	This work
H4-H6	6	2.5-4.5	3.5	(1)
L4-L6	9	3.9-8.9	5.3	(1)
L4-L6	14	2.7-5.3	4.4	This work
E4	2	1.0-5.2**	3.0	(1)
E5-E6	2	0.4-1.2	0.8	This work
E5-E6	1	---	0.3	(2)
E5-E6	2	0.25-0.48	0.4	(1)
Mesosiderite	7	2.0-4.9	3.4	This work
Silicate (no sulphide)				
H3	3	5.2-9.2	7.3	(13)
H4-H6	12	3.0-4.5	4.0	(13)
H4-H6	1	---	2.4	(32)
L3	1	---	8.9	(17)
L3	1	---	5.3	(13)
L4-L6	11	4.0-7.1	5.7	(17)
L4-L6	2	5.3-5.6	5.5	(13)
L4-L6	3	3.7-4.8	4.1	(32)
LL5	1	---	5.4	(17)
E6	1	---	0.7	(32)
H and L	3*	3.0-3.2	3.1	(12)
Siderophyre	1	---	0.4	(3)
Mesosiderite	1	---	0.5	This work
Mesosiderite	2	2.6-5.0	3.8	(39)
Mesosiderite	7	0.7-4.6	2.7	This work (calculated)

* Composite samples. ** Values affected by metal phase contamination.

TABLE 29

GALLIUM IN MINERAL PHASES OF STONY AND STONY-IRON METEORITES

Mineral	Number analysed	Range ppm	Mean ppm	Class
Olivine	5	0.6-2.0	1.5	L6, LL6, Pallasites
Orthopyroxene	7	< 1.0-5.0	1.6	L6, LL6, Howardite, E6, H, Aubrite, Anomalous chondrite
Clinopyroxene	6	1.0-4.0	2.0	Eucrite, Anomalous chrondrite, H, L6
Chromite	3	50.0-90.0	68.0	L6, LL6, H
Phosphate	2	2.0-2.0	2.0	L6, LL6
Plagioclase				
	3	3-9	4.3	Eucrite
	2	17.0-23.0	20.0	L-group
	1	---	8.0	Anomalous chondrite
	1	16.0-18.0	17.0	H-group
	1	---	1.0	E6

All data from Mason and Graham (1970), and Allen and Mason (1973).

TABLE 30

THE CLASSIFICATION OF METEORITES

(Figures in parentheses are the numbers of observed falls in each class)

Group	Class	Principal minerals
Chondrites	Enstatite (11)	Enstatite, nickel-iron
	Bronzite (236)	Olivine, bronzite, nickel-iron
	Hypersthene (327)	Olivine, hypersthene, nickel-iron
	Carbonaceous (33)	Serpentine, olivine
Achondrites[1]	Aubrites (8)	Enstatite
	Diogenites (9)	Hypersthene
	Chassignite (1)	Olivine
	Ureilites (3)	Olivine, clinobronzite, nickel-iron
	Angrite (1)	Augite
	Nakhlite (1)	Diopside, olivine
	Howardites (18)	Hypersthene, plagioclase
	Eucrites (25)	Pigeonite, plagioclase
	Shergottite (1)	Augite, pigeonite, plagioclase, iron oxides
Stony-irons	Pallasites (2)	Olivine, nickel-iron
	Siderophyre (1) (Find)	Orthopyroxene, nickel-iron
	Lodranite (1)	Orthopyroxene, olivine, nickel-iron
	Mesosiderites (6)	Pyroxene, plagioclase, nickel-iron
Irons	Hexahedrites (7)	Kamacite
	Octahedrites (32)	Kamacite, taenite
	Ni-rich ataxite (1)	Taenite

[1] Sometimes subdivided into calcium-poor achondrites (aubrites, diogenites, chassignite, ureilites) and calcium-rich achondrites (angrite, nakhlite, howardites, eucrites).

Taken from Mason (1972).

TABLE 31A.

****
* GALLIUM IN METEORITES. *
* CARBONACEOUS CHONDRITES. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
COLD BOKKEVELD	7.8	7.17	1.09	.4	.13	1.6		C2
MIGHEI	7.7	6.92	1.11	.4	.13	1.7		C2
MURRAY	7.7	6.60	1.16	.4	.13	1.8		C2
FELIX A	6.6	4.62	1.42	.4	.16	2.4		C3-O
FELIX B	7.0	4.95	1.42	.4	.13	1.9		C3-O
LANCE	6.6	4.72	1.39	.4	.16	2.4		C3-O
KAINSAZ A	8.4	5.88	1.43	.5	.17	2.0		C3-O
KAINSAZ B	8.2	5.74	1.43	.5	.16	2.0		C3-O
WARRENTON	7.6	5.39	1.40	.5	.17	2.2		C3-O
VIGARANO	4.9	2.29	2.13	.4	.14	2.9		C3-V
EFREMOVKA	5.6	3.39	1.65	.5	.15	2.6		C3-V
LEOVILLE *	5.1	2.78	1.83	.5	.16	3.1		C3-V
MOKOIA	5.4	2.89	1.85	.4	.15	2.8		C3-V
ALLENDE 1/3	6.0	3.55	1.69	.5	.16	2.7		C3-V
ALLENDE 4/22	5.4	3.09	1.75	.5	.16	3.0		C3-V
ALLENDE	5.6	3.23	1.74	.5	.16	2.9		C3-V
COOLIDGE *	3.6	2.18	1.67	.5	.16	4.3		C4-V

* FIND

TABLE 318.

****
* GALLIUM IN METEORITES. *
* CHONDRITES. *
* BRONZITE (H-GROUP). *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
KESEN	5.3	4.99	1.06	.4	.16	3.1		H4
ALLEGAN B	5.0	4.67	1.08	.4	.16	3.2		H5
FOREST CITY	4.9	4.60	1.06	.4	.16	3.3		H5
PANTAR	5.5	5.23	1.06	.4	.16	2.9		H5
PLAINVIEW *	4.9	4.58	1.07	.4	.17	3.5		H5
PULTUSK	5.6	5.28	1.06	.4	.17	3.0		H5
RICHARDTON A1	6.0	6.73	.89	.5	.18	3.0		H5
RICHARDTON A2	5.9	5.61	1.05	.5	.18	3.0		H5
RICHARDTON A3	5.9	5.62	1.05	.5	.18	3.0		H5
RICHARDTON A4	6.0	5.68	1.05	.5	.18	3.0		H5
BEARDSLEY	9.8	8.06	1.21	.4	.13	1.4		H5
GELUKSFONTEIN	5.3	4.89	1.09	.4	.16	3.0		H?
I'DUTYWA *	5.7	5.20	1.10	.4	.16	2.8		H?
MOSHESH LOCATION A *	5.4	5.06	1.07	.4	.17	3.1		H?
MOSHESH LOCATION B *	5.5	5.10	1.07	.4	.17	3.1		H?
MOSHESH LOCATION C *	5.3	4.92	1.07	.4	.16	3.1		H?
MOSHESH LOCATION D *	5.2	4.85	1.07	.4	.16	3.1		H?
MOSHESH LOCATION E *	5.1	4.75	1.07	.4	.16	3.2		H?
MOSHESH LOCATION F *	5.2	4.85	1.07	.4	.16	3.1		H?
SCHAAPKOOI A *	5.2	4.78	1.09	.4	.17	3.3		H?
SCHAAPKOOI B *	5.5	5.00	1.09	.4	.16	2.9		H?

* FIND

TABLE 31C.

****
* GALLIUM IN METEORITES. *
* CHONDRITES. *
* BRONZITE (H-GROUP). *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NON-MAGNETIC FRACTION								
RICHARDTON B	4.6		N.A.	.3	.09	2.0		H5
ALLEGAN A	3.4	2.80	1.20	.3	.10	2.9		H5
FOREST CITY	3.3	2.66	1.23	.3	.11	3.3		H5
MOSHESH LOCATION A *	3.6	2.71	1.32	.3	.11	3.2		H?

* FIND

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 31D.

GALLIUM IN METEORITES.
CHONDRITES.
HYPERSTHENE (L-GROUP).

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BJURBOLE	4.8	4.02	1.20	.4	.14	2.9		L4
MCKINNEY *	5.8	5.21	1.12	.4	.15	2.5		L4
FARMINGTON	4.6	3.93	1.18	.4	.12	2.5		L5
WITTEKRANTZ	4.7	3.95	1.18	.4	.14	3.0		L5
ALFIANELLO A	5.7	4.75	1.19	.4	.14	2.5		L6
ALFIANELLO B	5.5	4.52	1.22	.4	.14	2.6		L6
COLBY	5.2	4.68	1.12	.4	.10	1.9		L6
DRAKE CREEK	5.3	4.64	1.15	.4	.15	2.8		L6
HOLBROOK	4.4	3.88	1.13	.4	.14	3.2		L6
JACKALSFONTEIN	5.5	5.09	1.08	.4	.14	2.6		L6
KYUSHU	5.1	4.23	1.21	.4	.14	2.8		L6
LEEDEY A	4.7	4.06	1.15	.4	.12	2.5		L6
LEEDEY B	4.8	4.14	1.15	.4	.15	3.1		L6
MARION	5.3	4.62	1.14	.4	.15	2.8		L6
MODOC	4.7	4.18	1.12	.4	.14	3.0		L6
MONZE A	5.1	4.22	1.20	.4	.15	2.9		L6
MONZE B	5.2	4.33	1.20	.4	.14	2.7		L6
MUIZENBERG A *	4.5	4.14	1.08	.4	.13	3.0		L6
MUIZENBERG B *	4.4	4.11	1.08	.4	.13	3.0		L6
NEW CONCORD	5.5	4.93	1.11	.4	.16	2.8		L6
ST.MICHEL	6.1	5.05	1.21	.4	.15	2.4		L6

* FIND

TABLE 31E.

****
* GALLIUM IN METEORITES. *
* CHONDRITES. *
* HYPERSTHENE (L-GROUP). *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
HYPERSTHENE (L-GROUP) CONT.								
DIEP RIVER B	5.6	4.61	1.22	.4	.15	2.6		L?
DIEP RIVER C	5.4	4.45	1.22	.4	.14	2.6		L?
PAMPA DEL INFIERNO	5.2	4.85	1.07	.5	.15	2.9		L?
UNEQUILABRATED								
NGAWI	4.4	3.78	1.17	.4	.13	3.0		LL3
AMPHOTERITE								
DHURMSALA	4.5	3.78	1.18	.4	.13	3.0		LL6
ST.SEVERIN	5.1	4.86	1.04	.5	.16	3.1		LL6

TABLE 31F.

GALLIUM IN METEORITES.
CHONDRITES.
HYPERSTHENE (L-GROUP).

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NON-MAGNETIC FRACTION								
MCKINNEY *	4.4	3.65	1.20	.4	.13	2.9		L4
TENNASILM	5.3		N.A.	.3	.11	2.1		L4
AUSSON	4.6		N.A.	.3	.12	2.6		L5
FARMINGTON	2.7	2.23	1.23	.3	.11	4.1		L5
HENDERSONVILLE	4.7		N.A.	.4	.13	2.7		L5
WITTEKRANTZ	4.1	2.84	1.45	.3	.14	3.4		L5
ALFIANELLO A	4.6	3.39	1.35	.3	.12	2.6		L6
BRUDERHEIM	4.4		N.A.	.3	.12	2.7		L6
ELI ELAAH	4.3		N.A.	.4	.13	3.0		L6
JACKALSFONTEIN	5.0	3.92	1.27	.3	.12	2.4		L6
LEEDEY A	4.4	3.61	1.22	.3	.12	2.7		L6
LEEDEY B	4.3	3.49	1.22	.3	.12	2.8		L6
MONZE A	4.6	3.68	1.24	.3	.12	2.6		L6
MONZE B	4.5	3.66	1.24	.3	.11	2.5		L6
NEW CONCORD	4.4	3.60	1.23	.3	.10	2.4		L6
DIEP RIVER	4.6	3.30	1.39	.3	.12	2.6		L?

* FIND

*** N.A. = AL203 NOT KNOWN ***

TABLE 31G.

****
* GALLIUM IN METEORITES. *
* CHONDRITES. *
* ENSTATITE. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
TYPE I								
ABEE	20.1	25.77	.78	.5	.20	1.0		E4
INDARCH	16.6	21.34	.78	.5	.18	1.1		E4
INTERMEDIATE								
ST.MARKS	15.6	19.02	.82	.5	.19	1.2		E5
TYPE II								
ATLANTA *	9.9	10.01	.99	.4	.16	1.6		E6
HVITTIS	10.3	11.94	.86	.4	.15	1.4		E6
PILLISTFER	10.7	10.48	1.02	.4	.17	1.6		E6
BLITHFIELD *	5.5	4.95	1.11	.4	.13	2.4		E6
NON-MAGNETIC FRACTION								
ST.MARKS	1.2	1.19	1.05	.3	.10	8.0		E5
HVITTIS	.4	.29	1.29	.2	.05	12.9		E6

* FIND

TABLE 31H.

****
* GALLIUM IN METEORITES. *
* ACHONDRITES. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
EUCRITES								
BEREBA	1.2	.18	6.75	.4	.13	10.7		EUCRITE
CACHARI *	1.7	.25	6.80	.4	.13	7.5		EUCRITE
HARAIYA	1.4	.20	6.61	.4	.13	9.4		EUCRITE
JUVINAS	1.4	.21	6.88	.4	.13	8.9		EUCRITE
MACIBINI	1.2	.19	6.41	.4	.07	5.9		EUCRITE
PASAMONTE	1.3	.19	6.52	.4	.07	5.8		EUCRITE
SIOUX COUNTY	1.5	.22	6.80	.4	.07	4.9		EUCRITE
HOWARDITES								
FRANKFORT (F)	.7	.23	2.88	.4	.08	12.9		HOWARDITE
FRANKFORT (T)	.6	.25	2.26	.4	.07	12.2		HOWARDITE
SINDA *	.7	.20	3.59	.4	.08	11.3		HOWARDITE
SINDA (S) *	1.1	.30	3.73	.4	.13	11.3		HOWARDITE
CHAVES	1.0	.28	3.62	.4	.11	11.0		HOWARDITE
MALVERN	1.2	.22	5.27	.4	.13	11.0		HOWARDITE
MALVERN A	1.0	.19	5.33	.4	.08	8.6		HOWARDITE
MALVERN B	1.3	.25	5.33	.4	.10	7.3		HOWARDITE
MALVERN C	1.1	.20	5.33	.4	.10	9.3		HOWARDITE
MALVERN (BLM)	1.1	.19	5.62	.5	.14	13.3		HOWARDITE
MALVERN (UCT)	1.3	.24	5.30	.4	.14	11.2		HOWARDITE
MOLTENO	.9	.20	4.74	.4	.13	13.7		HOWARDITE
KAPOETA	.9	.21	4.30	.4	.13	14.5		HOWARDITE

TABLE 311.

****
* GALLIUM IN METEORITES. *
* ACHONDRITES. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NAKHLITES								
EL NAKHLA	2.8	3.61	.77	.4	.10	3.6		NAKHLITE
UREILITES								
GOALPARA	.9	18.37	.05	.4	.07	8.4		UREILITE
DIOGENITES								
ELLEMEET A	< .4	< .75	.49	.4				DIOGENITE
ELLEMEET B	< .4	< .75	.49	.4				DIOGENITE
JOHNSTOWN	< .4	< .55	.65	.4				DIOGENITE
SHALKA	< .4	< 1.13	.32	.4				DIOGENITE
TATAHOUINE	< .4	< 1.30	.27	.4				DIOGENITE
AUBRITES								
NORTON COUNTY	< .2	< 1.48	.12	.2				AUBRITE
CUMBERLAND FALLS	< .2	< 1.04	.21	.2				AUBRITE
SHALLOWATER *	6.3	12.66	.50	.4	.11	1.8		AUBRITE

* FIND

TABLE 31J.

GALLIUM IN METEORITES.
CHASSIGNITES AND MESOSIDERITES.

SAMPLE NAME		PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CHASSIGNITE									
CHASSIGNY		.8	4.39	.19	.4	.12	13.8		CHASSIGNITE
MESOSIDERITES									
BONDOC *		.5		N.A.	.4	.07	15.0		MESOSIDERITE (SILICATE FRACTION)
MOUNT PADBURY *	1	2.6	.74	3.54	.4	.13	5.1		MESOSIDERITE (NON-MAGNETIC FRACTION)
PATWAR	1	2.0	.61	3.36	.5	.15	7.3		MESOSIDERITE (NON-MAGNETIC FRACTION)
ESTHERVILLE	1	3.0	.63	4.76	.4	.11	3.8		MESOSIDERITE (NON-MAGNETIC FRACTION)
VACA MUERTA *	1	3.1	.82	3.78	.5	.18	5.7		MESOSIDERITE (NON-MAGNETIC FRACTION)
LOWICZ	3	4.8	.86	5.60	.4	.13	2.6		MESOSIDERITE (NON-MAGNETIC FRACTION)
MINCY *	3	3.6	1.02	3.54	.4	.11	3.1		MESOSIDERITE (NON-MAGNETIC FRACTION)
EMERY *		4.9	.81	6.06	.4	.13	2.6		MESOSIDERITE (NON-MAGNETIC FRACTION)

* FIND

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 31K.

GALLIUM IN METEORITES.
RECALCULATED VALUES FOR THE WHOLE METEORITE AND THE SILICATE FRACTION IN MESOSIDERITES.

SAMPLE NAME		PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
WHOLE METEORITE									
MOUNT PADBURY * **	1	5.2	2.50	2.08	.0	.00	.0		MESOSIDERITE
PATWAR	1	4.9	2.34	2.09	.0	.00	.0		MESOSIDERITE
ESTHERVILLE *	1	6.4	3.08	2.07	.0	.00	.0		MESOSIDERITE
VACA MUERTA *	1	5.8	2.62	2.21	.0	.00	.0		MESOSIDERITE
LOWICZ	3	10.1	3.66	2.76	.0	.00	.0		MESOSIDERITE
MINCY *	3	8.2	4.53	1.81	.0	.00	.0		MESOSIDERITE
EMERY *		9.0	3.86	2.33	.0	.00	.0		MESOSIDERITE
SILICATE FRACTION									
MOUNT PADBURY *	1	1.7	.39	4.34	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)
PATWAR	1	.7	.16	4.26	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)
ESTHERVILLE	1	2.7	.53	5.12	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)
VACA MUERTA *	1	1.7	.32	5.26	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)
LOWICZ	3	4.3	.72	6.01	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)
MINCY *	3	2.9	.73	3.96	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)
EMERY *		4.6	.71	6.48	.0	.00	.0		MESOSIDERITE (SILICATE FRACTION)

* FIND, PERCENT METAL FROM POWELL (1971) (+) AND MCCALL (1966) (++).

TABLE 32.

STATISTICAL INFORMATION ON GA, AL AND GA/AL RATIO DISTRIBUTIONS IN METEORITES ANALYSED IN THIS WORK. NO. OF SAMPLES IN BRACKETS. MEDIAN VALUES ARE REPORTED WHEN 3 OR MORE SAMPLES ARE PRESENT IN A GROUP, AND MODAL VALUES WHEN 15 OR MORE SAMPLES ARE PRESENT.

METEORITE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
800000 METEORITES	5.2(110)	5.3	5.4	<.2-20.1	4.60(110)	.18-25.77	1.91(110)	.05- 6.88
810000 CHONDRITES	6.3(72)	5.4	5.4	3.7-20.1	5.66(72)	2.18-25.77	1.20(72)	.78- 2.13
811000 ENSTATITE CHONDRITES	12.7(7)	10.7	.0	5.5-20.0	14.79(7)	4.95-25.77	.91(7)	.78- 1.11
811100 ENSTATITE CHONDRITE,TYPE I	18.3(2)	.0	.0	16.6-20.0	23.56(2)	21.34-25.77	.78(2)	.78- .78
811110 ENSTATITE CHONDRITE, I, NM	10.8(1)	.0	.0	10.8-10.8	12.29(1)	12.29-12.29	.88(1)	.88- .88
811200 ENSTATITE CHONDRITE INTERMED	15.6(1)	.0	.0	15.6-15.6	19.02(1)	19.02-19.02	.82(1)	.82- .82
811210 ENSTATITE CHONDRITE INTER, NM	1.2(1)	.0	.0	1.2- 1.2	1.19(1)	1.19- 1.19	1.05(1)	1.05- 1.05
811300 ENSTATITE CHONDRITE TYPE II	9.1(4)	10.1	.0	5.5-10.7	9.35(4)	4.95-11.94	1.00(4)	.86- 1.11
811310 ENSTATITE CHONDRITE, II, NM	.4(1)	.0	.0	.4- .4	.29(1)	.29- .29	1.29(1)	1.29- 1.29
812000 BRONZITE CHONDRITES	5.6(21)	5.4	5.4	4.9- 9.8	5.26(21)	4.58- 8.06	1.07(21)	.89- 1.21
812100 BRONZITE CHONDRITES, NMFRAC	3.7(4)	3.5	.0	3.3- 4.6	2.72(3)	2.66- 2.80	1.25(3)	1.20- 1.32
813000 HYPERSTHENE CHONDRITES	5.1(25)	5.2	5.3	4.4- 6.1	4.46(25)	3.88- 5.21	1.15(25)	1.09- 1.22
813100 HYPERSTHENE CHONDRITES NMFRAC	4.4(16)	4.5	4.5	2.7- 5.3	3.40(11)	2.23- 3.92	1.28(11)	1.20- 1.45

TABLE 32. (CONTD)

METEORITE	GALLIUM PPM MEAN		MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN		RANGE	ALUMINIUM % MEAN		RANGE
814000 CARBONACEOUS CHONDRITES	6.4	(17)	6.6	7.8	3.7- 8.4	4.43	(17)	2.18- 7.17	1.54	(17)	1.09- 2.13
814200 CARBONACEOUS CHONDRITES C2	7.7	(3)	7.7	.0	7.6- 7.8	6.90	(3)	6.60- 7.17	1.12	(3)	1.09- 1.16
814310 CARBONACEOUS CHONDRITES C3-V	5.2	(8)	5.4	.0	3.7- 6.0	2.92	(8)	2.18- 3.55	1.79	(8)	1.65- 2.13
814320 CARBONACEOUS CHONDRITES C3-O	7.4	(6)	7.3	.0	6.6- 8.4	5.22	(6)	4.62- 5.88	1.41	(6)	1.39- 1.43
815000 AMPHOTERITE CHONDRITE	4.5	(1)	.0	.0	4.5- 4.5	3.18	(1)	3.18- 3.18	1.40	(1)	1.40- 1.40
816000 UNEQUILIBRATED CHONDRITE	4.4	(1)	.0	.0	4.4- 4.4	3.78	(1)	3.78- 3.78	1.17	(1)	1.17- 1.17

TABLE 32. (CONTD)

METEORITE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
820000 ACHONDRITES	1.4(31)	1.1	1.0	<.2- 6.3	1.81(31)	.18-18.37	3.49(31)	.05- 6.88
821000 AUBRITES	2.2(3)	.0	.0	<.2- 6.3	~5.00(3)	<1.04-12.66	.31(3)	.12- .50
822000 DIOGENITES	.0(0)	.0	.0	.0- .0	.00(0)	.00- .00	.00(0)	.00- .00
823000 CHASSIGNITES	.8(1)	.0	.0	.8- .8	4.39(1)	4.39- 4.39	.19(1)	.19- .19
824000 UREILITES	.9(1)	.0	.0	.9- .9	18.37(1)	18.37-18.37	.05(1)	.05- .05
826000 NAKHLITES	2.8(1)	.0	.0	2.8- 2.8	3.61(1)	3.61- 3.61	.77(1)	.77- .77
827000 HOWARDITES	1.0(13)	1.0	.0	.6- 1.3	.23(13)	.19- .30	4.41(13)	2.26- 5.62
828000 EUCRITES	1.4(7)	1.4	.0	1.2- 1.7	.21(7)	.18- .25	6.68(7)	6.41- 6.88
834000 MESOSIDERITES	7.1(7)	6.4	.0	5.1-10.1	3.25(7)	2.44- 4.53	2.19(7)	1.81- 2.76
834100 MESOSIDERITES, SI FRACTION	2.3(8)	2.4	.0	.5- 4.2	.49(7)	.16- .65	5.06(7)	3.96- 6.48
834200 MESOSIDERITES, NM FRACTION	3.4(7)	3.1	.0	2.1- 4.9	.78(7)	.61- 1.02	4.38(7)	3.36- 6.06

TABLE 33

DATA FOR THE PROPORTIONS OF METAL, SULPHIDE AND NON-MAGNETIC FRACTIONS IN MESOSIDERITES AND THE Ga CONTENTS OF VARIOUS FRACTIONS

Meteorites	Magnetic fraction % *	Metal % **	Metal+ % *	Sulphide+ FeS % *	Ga in metal ppm ***	Ga in bulk sample ppm	Ga in non-mag. fraction ppm	Ga in silicate fraction ppm	Ga_{NM}/Ga_{met}	Ga_{sil}/Ga_{met}
Group 1										
Estherville	--	56.4	1.79	4.9	9.0	6.4	3.0	2.7	0.33	0.30
Mount Padbury	--	42.0(1)	6.80	8.4	8.9	5.2	2.6	1.7	0.29	0.19
Patwar	37.7	33.2	1.06	18.9	9.6	4.9	2.0	0.7	0.21	0.07
Vaca Muerta	41.4	47.3	6.04	16.7	9.6	5.8	3.1	1.7	0.32	0.18
Group 3										
Mincy	48.8	--	6.53	1.5	13.1	8.2	3.6	2.9	0.27	0.22
Lowicz	50.7	59.6	4.56	0.7	15.3	10.1	4.8	4.3	0.31	0.28
Unclassified										
Emery	61.5	--	3.89	1.1	11.5	9.0	4.9	4.6	0.43	0.40
								Mean	0.31	0.23

* Simpson (1978). ** Powell (1971). *** Wasson et al. (1974). (1) McCall (1966). + In non-magnetic fraction. FeS assumed to contain 7 ppm Ga for purposes of calculating Ga content of silicate fraction. From Tables 27 and 28 the H-group and L-group chondrites have Ga_{NM}/Ga_{met} ratios equal to 0.26 and 0.35 respectively, and Ga_{sil}/Ga_{met} equal to 0.28 and 0.39.

TABLE 34.

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

Q = QUARTZ, A = ALKALI FELDSPAR, P = PLAGIOCLASE, F = FELSPATHOIDS, M = MAFIC AND RELATED MINERALS

100000 PLUTONIC AND HYPABYSSAL

- 110000 QUARTZ ROCKS. Q=60-100% OF LIGHT COLOURED MINERALS.
  - 111000 QUARTZOLITE
  - 112000 QUARTZ-RICH GRANITOIDS
- 120000 Q + A + P ROCKS. Q=20-60% OF LIGHT COLOURED MINERALS.
  - 121000 ALKALI-FELSPAR GRANITE
  - 122000 GRANITE
    - 122100 LEUCOGRANITE (ALASKITE)
    - 122200 GRANOPHYRE
      - 122210 FAYALITE GRANOPHYRE
    - 122300 LEUCO GRANOPHYRE
    - 122400 MELA GRANOPHYRE
    - 122500 SYENOGRANITE
    - 122600 MONZOGRANITE
    - 122700 BIOTITE GRANITE
    - 122800 TWO MICA GRANITE
    - 122900 FINE-GRAINED GRANITE (APLITE)
    - 122A00 MEDIUM-GRAINED GRANITE
    - 122B00 COARSE-GRAINED GRANITE
    - 122C00 AMPHIBOLE GRANITE

TABLE 34 (CONTD).

122C10	HORNBLENDE GRANITE
122D00	PYROXENE GRANITE (CHARNOCKITE)
123000	GRANODIORITE
124000	TONALITE
124200	HORNBLENDE TONALITE
125000	GRANITOID PORPHYRY
125100	QUARTZ FELSPAR PORPHYRY
125200	FELSPAR PORPHYRY
126000	LEUCO TONALITE
126100	LEUCO BIOTITE TONALITE
127000	MELA TONALITE
130000	A + P + Q ROCKS. Q=5-20% OF LIGHT COLOURED MINERALS.
131000	ALKALI-FELSPAR QUARTZ SYENITE
132000	QUARTZ SYENITE
133000	QUARTZ MONZONITE (ADAMELLITE)
134000	QUARTZ MONZODIORITE
135000	QUARTZ MONZOGABBRO
136000	QUARTZ DIORITE
137000	QUARTZ GABBRO
138000	QUARTZ ANORTHOSITE
139000	QUARTZ DOLERITE
13A000	QUARTZ NORITE
140000	A + P +- Q ROCKS. Q=0-5% OF LIGHT COLOURED MINERALS.

TABLE 34 (CONTD).

141000 ALKALI-FELSPAR SYENITE

141100 NORDMARKITE

142000 SYENITE
143000 MONZONITE

143100 BOSTONITE

144000 MONZODIORITE
145000 MONZOGABBRO
146000 DIORITE

146100 PYROXENE DIORITE
146200 FERRODIORITE

147000 GABBROID ROCKS

147100 GABBROID ROCKS - PLAG + PYX + OL

147110 LEUCO OLIVINE-BEARING GABBRONORITE
147120 OLIVINE-BEARING GABBRONORITE
147130 MELA OLIVINE-BEARING GABBRONORITE
147140 LEUCO OLIVINE-GABBRONORITE
147150 OLIVINE-GABBRONORITE
147160 MELA OLIVINE-GABBRONORITE
147170 LEUCO TROCTOLITE
147180 TROCTOLITE
147190 MELA TROCTOLITE
1471A0 LEUCO OLIVINE-NORITE
1471B0 OLIVINE-NORITE
1471C0 MELA OLIVINE-NORITE
1471D0 LEUCO OLIVINE-GABBRO
1471E0 OLIVINE-GABBRO

TABLE 34 (CONTD).

	1471E1	OLIVINE FERROGABBRO
	1471E2	GABBRO-PICRITE
	1471E3	OLIVINE ORTHOPYROXENE GABBRO
	1471E4	OLIVINE ORTHOPYROXENE FERROGABBRO
1471F0		MELA OLIVINE-GABBRO
1471G0		OLIVINE DOLERITE
147200	GABBROID ROCKS - PLAG + PYX	
147210		LEUCO NORITE
147220		NORITE
147230		MELA NORITE
147240		LEUCO GABBRONORITE
147250		GABBRONORITE
147260		MELA GABBRONORITE
147270		LEUCO GABBRO
147280		GABBRO
	147281	FERROGABBRO
	147282	ORTHOPYROXENE FERROGABBRO
	147283	BIOTITE ORTHOPYROXENE GABBRO
	147284	OLIVINE-BEARING GABBRO
147290		MELA GABBRO
1472A0		DOLERITE
1472B0		EUCRITE
147300	GABBROID ROCKS - PLAG + PYX + AMPHIBOLE	
147310		LEUCO AMPHIBOLE-BEARING GABBRONORITE
	147311	LEUCO HORNBLENDE-BEARING GABBRONORITE
147320		AMPHIBOLE-BEARING GABBRONORITE

TABLE 34 (CONTD).

147321 HORNBLENDE-BEARING GABBRONORITE

147330 MELA AMPHIBOLE-BEARING GABBRONORITE

147331 MELA HORNBLENDE-BEARING GABBRONORITE

147340 LEUCO PYROXENE AMPHIBOLE GABBRONORITE

147341 LEUCO PYROXENE HORNBLENDE GABBRONORITE

147350 PYROXENE AMPHIBOLE GABBRONORITE

147351 PYROXENE HORNBLENDE GABBRONORITE

147360 MELA PYROXENE AMPHIBOLE GABBRONORITE

147361 MELA PYROXENE HORNBLENDE GABBRONORITE

147370 LEUCO AMPHIBOLE GABBRO

147371 LEUCO HORNBLENDE GABBRO

147380 AMPHIBOLE GABBRO

147381 HORNBLENDE GABBRO

147390 MELA AMPHIBOLE GABBRO

147391 MELA HORNBLENDE GABBRO

148000 ANORTHOSITE

148100 TROCTOLITIC ANORTHOSITE
148200 NORITIC ANORTHOSITE

TABLE 34 (CONTD).

150000 A + P +- F ROCKS. F=0-10% OF LIGHT COLOURED MINERALS.

151000 FOID-BEARING ALKALI-FELSPAR SYENITE

151100 PULASKITE

152000 FOID-BEARING SYENITE

152100 NEPHELINE-CANCRINITE-PYROXENE SYENITE
152200 AMPHIBOLE-NEPHELINE SYENITE
152300 NEPHELINE-AMPHIBOLE-PYROXENE SYENITE
152400 NEPHELINE-SYENITE
152500 NEPHELINE CANCRINITE SODALITE SYENITE
152600 CANCRINITE SODALITE SYENITE

153000 FOID-BEARING MONZONITE
154000 FOID-BEARING MONZODIORITE
155000 FOID-BEARING MONZOGABBRO
156000 FOID-BEARING DIORITE
157000 FOID-BEARING GABBRO

157100 NEPHELINE OLIVINE GABBRO
157200 NEPHELINE OLIVINE DOLERITE
157300 NEPHELINE-BEARING OLIVINE GABBRO
157400 NEPHELINE-BEARING OLIVINE DOLERITE

160000 A + P + F ROCKS. F=10-60% OF LIGHT COLOURED MINERALS.

161000 FOID SYENITE (FOYAITE)

161100 TINGUAITE

161110 SODALITE TINGUAITE

162000 FOID MONZOSYENITE

TABLE 34 (CONTD).

163000 FOID MONZODIORITE (ESSEXITE)

163100 ANDESINE MONZODIORITE
163200 OLIGOCLASE MONZODIORITE

164000 FOID MONZOGABBRO (ESSEXITE)
165000 FOID DIORITE (THERALITE)
166000 FOID GABBRO (THERALITE)

166100 NEPHELINE GABBRO

170000 F +- A +- P ROCKS. F=60-100% OF LIGHT COLOURED MINERALS.

171000 URTITE
172000 IJOLITE

172100 JACUPIRANGITE

173000 MELTEIGITE
174000 ITALITE
175000 FERGUSITE
176000 MISSOURITE
177000 NEPHELINITE

180000 ULTRAMAFIC ROCKS M=90-100

181000 ULTRAMAFIC ROCKS COMPOSED OF OLIVINE AND PYROXENE

181100 PERIDOTITE

181110 SERPENTINISED PERIDOTITE

181200 PYROXENITE
181300 DUNITE

181310 HORTONOLITE DUNITE

TABLE 34 (CONTD).

181400 WEHRLITE

181410 SERPENTINISED WEHRLITE

181500 LHERZOLITE

181510 GARNET-BEARING LHERZOLITE
181520 GARNET LHERZOLITE

181600 HARZBURGITE

181610 SERPENTINISED HARZBURGITE

181700 OLIVINE CLINOPYROXENITE
181800 OLIVINE-WEBSTERITE
181900 OLIVINE-ORTHOPYROXENITE
181A00 CLINOPYROXENITE
181B00 WEBSTERITE

181B10 AMPHIBOLITISED WEBSTERITE

181C00 ORTHOPYROXENITE

182000 ULTRAMAFIC ROCKS CONTAINING AMPHIBOLE. OL+PYX+AMPH+(BI+GAR+SP)>=95

182100 AMPHIBOLE-BEARING PERIDOTITE

182110 HORNBLENDE-BEARING PERIDOTITE

182200 AMPHIBOLE-BEARING PYROXENITE

182210 HORNBLENDE-BEARING PYROXENITE

182300 AMPHIBOLE ROCK

TABLE 34 (CONTD).

182310	HORNBLENDITE
182400	AMPHIBOLE-BEARING DUNITE
182410	HORNBLENDE-BEARING DUNITE
182500	AMPHIBOLE PERIDOTITE
182510	HORNBLENDE PERIDOTITE
182600	PYROXENE AMPHIBOLE PERIDOTITE
182610	PYROXENE HORNBLENDE PERIDOTITE
182700	PYROXENE-PERIDOTITE
182800	OLIVINE AMPHIBOLE ROCK
182810	OLIVINE HORNBLENDITE
182900	OLIVINE PYROXENE AMPHIBOLE ROCK
182910	OLIVINE PYROXENE HORNBLENDITE
182A00	OLIVINE AMPHIBOLE PYROXENITE
182A10	OLIVINE HORNBLENDE PYROXENITE
182B00	OLIVINE-PYROXENITE
182C00	PYROXENE AMPHIBOLE ROCK
182C10	PYROXENE HORNBLENDITE
182D00	AMPHIBOLE PYROXENITE
182D10	HORNBLENDE PYROXENITE

TABLE 34 (CONTD).

183000 ULTRAMAFIC ROCKS CONTAINING PLAGIOCLASE - OL+PYX+PLAG

- 183100 PLAGIOCLASE-BEARING DUNITE
- 183200 PLAGIOCLASE-BEARING CLINOPYROXENITE
- 183300 PLAGIOCLASE-BEARING OLIVINE-CLINOPYROXENITE
- 183400 PLAGIOCLASE-BEARING WEHRLITE
- 183500 PLAGIOCLASE-BEARING ORTHOPYROXENITE
- 183600 PLAGIOCLASE-BEARING OLIVINE-ORTHOPYROXENITE
- 183700 PLAGIOCLASE-BEARING HARZBURGITE
- 183800 PLAGIOCLASE-BEARING WEBSTERITE
- 183900 PLAGIOCLASE-BEARING OLIVINE-WEBSTERITE
- 183A00 PLAGIOCLASE-BEARING LHERZOLITE
- 183B00 PICRITE
- 183C00 PLAGIOCLASE-BEARING PYROXENITE

184000 ULTRAMAFIC ROCKS CONTAINING NO OLIVINE

- 184100 ECLOGITE
  - 184110 KYANITE ECLOGITE
  - 184120 CORUNDUM ECLOGITE

185000 ULTRAMAFIC ROCKS CONTAINING MELILITE

- 185100 MELILITITE
  - 185110 NEPHELINE MELILITITE
  - 185120 OLIVINE MELILITITE

186000 SERPENTINITE

187000 KIMBERLITE

- 187100 KIMBERLITE, MICA-RICH
- 187200 KIMBERLITE, NON-MICACEOUS

TABLE 34 (CONTD).

187300 KIMBERLITE, CARBONATITIC
187400 KIMBERLITE, NON-MICACEOUS CARBONATE-RICH

188000 KIMBERLITIC XENOLITHS

188100 ECLOGITE XENOLITH

188110 KYANITE ECLOGITE XENOLITH
188120 CORUNDUM ECLOGITE XENOLITH

188200 PHLOGOPITE XENOLITH
188300 CLINOPYROXENE XENOLITH
188400 ILMENITE XENOLITH
188500 CLINOPYROXENE-ILMENITE XENOLITH
188600 GARNET XENOLITH
188700 WEBSTERITE XENOLITH

188710 GARNET WEBSTERITE XENOLITH

188800 LHERZOLITE XENOLITH

188810 GARNET LHERZOLITE XENOLITH

188900 PYROXENITE XENOLITH
188A00 PERIDOTITE XENOLITH

190000 LAMPROPHYRES

191000 CAMPTONITE
192000 LEUCOCAMPTONITE
193000 MELACAMPTONITE
194000 MONCHIQUITE

194100 NEPHELINE MONCHIQUITE

195000 ALNOITE

TABLE 34 (CONTD).

1A0000 NON-SILICATE ROCKS

1A1000 CARBONATITE

1A1100 SOVITE
1A1200 BEFORSITE

1A2000 SULPHIDE ROCKS
1A3000 OXIDE ROCKS

1A3100 CHROMITITE
1A3200 MAGNETITE ROCK

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

Q = QUARTZ, A = ALKALI FELDSPAR, P = PLAGIOCLASE, F = FELSPATHOIDS, M = MAFIC AND RELATED MINERALS

200000 VOLCANIC ROCKS (MINERALOGICAL CLASSIFICATION)

- 210000 GLASSY ROCKS WITH NO PHENOCRYSTS
  - 211000 PITCHSTONE
  - 212000 OBSIDIAN
    - 212100 RHYOLITIC OBSIDIAN
    - 212200 TRACHYTIC OBSIDIAN
    - 212300 COMENDITIC OBSIDIAN
- 220000 Q + A + P ROCKS. Q=20-60% OF LIGHT COLOURED MINERALS.
  - 221000 ALKALI RHYOLITE
    - 221100 COMENDITE
    - 221200 PANTELLARITE
  - 222000 RHYOLITE
  - 223000 RHYODACITE
  - 224000 DACITE
    - 224100 ICELANDITE (FERRODACITE)
  - 225000 QUARTZ-ANDESITE
  - 226000 PORPHYRY
    - 226100 QUARTZ FELSPAR PORPHYRY

TABLE 34 (CONTD).

226200 FELSPAR PORPHYRY

227000 FELSITE

230000 A + P + Q ROCKS. Q=5-20% OF LIGHT COLOURED MINERALS.

231000 ALKALI QUARTZ TRACHYTE
232000 QUARTZ TRACHYTE
233000 QUARTZ LATITE
234000 QUARTZ LATITE ANDESITE
235000 QUARTZ LATITE BASALT
236000 QUARTZ ANDESITE
237000 QUARTZ BASALT

240000 A + P +- Q ROCKS. Q=0-5% OF LIGHT COLOURED MINERALS.

241000 ALKALI TRACHYTE

241100 AEGIRINE-AUGITE TRACHYTE

242000 TRACHYTE

242100 HORNBLENDE TRACHYTE

243000 LATITE

243100 OLIVINE LATITE

244000 LATITE ANDESITE (TRACHYANDESITE)

244100 MUGEARITE (OLIVINE LATITE ANDESITE)

244110 BIOTITE MUGEARITE

244200 BENMOREITE

TABLE 34, (CONTD).

244300 BIOTITE LATITE ANDESITE

245000 LATITE BASALT (TRACHYBASALT)
246000 ANDESITE

246100 LABRADORITE ANDESITE

247000 BASALTIC ROCKS

247100 BASALTIC ROCKS - PLAG + PYX + OL

247110 OLIVINE BASALT

247111 PICRITIC BASALT

247120 OLIVINE MELABASALT
247130 OLIVINE THOLEIITE BASALT

247200 BASALTIC ROCKS - PLAG + PYX

247210 THOLEIITE BASALT

247211 PLAGIOCLASE (PHYRIC) THOLEIITE BASALT

247220 BASALT

247221 FERROBASALT

247230 MELABASALT
247240 BASALTIC KOMATIITE

247300 BASALTIC ROCKS - PLAG + PYX + AMPHIBOLE

247310 HORNBLENDE BASALT (YAMASKITE)

250000 A + P +- F ROCKS. F=0-10% OF LIGHT COLOURED MINERALS.

TABLE 34 (CONTD).

251000 FOID-BEARING ALKALI TRACHYTE
252000 FOID-BEARING TRACHYTE
253000 FOID-BEARING LATITE
254000 FOID-BEARING LATITE ANDESITE

254100 TAHITITE

255000 FOID-BEARING LATITE BASALT
256000 FOID-BEARING ANDESITE (ALKALI ANDESITE)
257000 FOID-BEARING BASALTIC ROCKS (ALKALI BASALTIC ROCKS)

257100 ALKALI OLIVINE BASALT

257110 HAWAIITE
257120 OLIVINE AUGITE BASALT
257130 TRISTANITE
257140 SHOSHONITE
257150 ABSAROKITE

257200 ALKALI OLIVINE MELABASALT
257300 ALKALI BASALT

257310 AUGITE BASALT

257400 ALKALI MELABASALT

260000 A + P + F ROCKS. F=10-60% OF LIGHT COLOURED MINERALS.

261000 PHONOLITE
262000 TEPHRITIC PHONOLITE
263000 PHONOLITIC TEPHRITE
264000 TEPHRITE

264100 OLIVINE TEPHRITE (BASANITE)

TABLE 34 (CONTD).

270000 F +- A +- P ROCKS F=60-100% OF LIGHT COLOURED MINERALS.

271000 PHONOLITIC FOIDITES

271100 PHONOLITIC NEPHELINITE

272000 TEPHRITIC FOIDITES

273000 NEPHELINITE

273100 OLIVINE NEPHELINITE

273200 MELILITE NEPHELINITE

274000 LEUCITITE

274100 NEPHELINE LEUCITITE

280000 ULTRAMAFIC ROCKS M=90-100

281000 ULTRAMAFIC ROCKS COMPOSED OF OLIVINE + PYROXENE.

281100 LIMBURGITE

281200 PERIDOTITIC KOMATIITE

282000 ULTRAMAFIC ROCKS COMPOSED OF OLIVINE + PYROXENE + AMPHIBOLE

283000 ULTRAMAFIC ROCKS COMPOSED OF OLIVINE + PYROXENE + PLAGIOCLASE.

283100 OCEANITE

283200 ANKARAMITE

283300 PICRITE

284000 KIMBERLITE

284100 KIMBERLITE, MICA-RICH

284200 KIMBERLITE, NON-MICACEOUS

TABLE 34 (CONTD).

284300 KIMBERLITE, CARBONATITIC
284400 KIMBERLITE, NON-MICACEOUS CARBONATE-RICH

285000 ULTRAMAFIC ROCKS CONTAINING MELILITE.

285100 MELILITITE

285110 OLIVINE MELILITITE

286000 SERPENTINITE

290000 FRAGMENTAL ROCKS

291000 FELSIC TUFF
292000 ERUPTIVE BRECCIA

2A0000 NON-SILICATE ROCKS

2A1000 CARBONATITE

2A1100 LENGAITE

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

300000 VOLCANIC ROCKS (CHEMICAL CLASSIFICATION)

310000 SUBALKALINE ROCKS

311000 THOLEIITIC SERIES

311100 THOLEIITIC PICRITE
311200 THOLEIITE
311300 QUARTZ-THOLEIITE
311400 ICELANDITE
311500 THOLEIITIC RHYOLITE
311600 PERIDOTITIC KOMATIITE
311700 BASALTIC KOMATIITE

311710 BASALTIC KOMATIITE, BARBERTON TYPE
311720 BASALTIC KOMATIITE, BADPLAAS TYPE
311730 BASALTIC KOMATIITE, GELUK TYPE

312000 CALC-ALKALINE SERIES

312100 HIGH-ALUMINA BASALT
312200 LOW-SILICA ANDESITE
312300 ANDESITE

312310 LOW-K ANDESITE
312320 HIGH-K ANDESITE

312400 DACITE
312500 RHYODACITE

TABLE 34 (CONTD).

312600 RHYOLITE

320000 ALKALINE ROCKS, VOLCANIC (CHEMICAL)

321000 SODIC SERIES, VOLCANIC (CHEMICAL)

321100 PICRITE BASALT, SODIC SERIES
321200 ANKARAMITE, SODIC SERIES
321300 NEPHELINITE
321400 ALKALI BASALT, SODIC SERIES
321500 HAWAIITE
321600 MUGEARITE
321700 BENMORITE
321800 SODIC TRACHYTE
321900 PHONOLITE

322000 POTASSIC SERIES, VOLCANIC (CHEMICAL)

322100 PICRITE BASALT, POTASSIC SERIES
322200 ANKARAMITE, POTASSIC SERIES
322300 ALKALI BASALT, POTASSIC SERIES
322400 TRACHYBASALT
322500 TRISTANITE
322600 TRACHYTE
322700 LEUCITE-PHONOLITE

330000 PERALKALINE ROCKS

331000 PANTELLERITE
332000 COMENDITE

340000 NON-SILICATE ROCKS

341000 CARBONATITE

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

400000 SEDIMENTARY (CLASTIC)

490000 SAND (UNKNOWN TYPE)
4B0000 MEDIUM SAND

4BC000 SUBGREYWACKE MEDIUM SAND

4BC300 SUBGREYWACKE CLAY-SILT

4BD000 GREYWACKE MEDIUM SAND

4BD300 GREYWACKE CLAY-SILT

4D0000 SANDSTONE (UNKNOWN TYPE)

4DC000 SUBGREYWACKE
4DD000 GREYWACKE

4K0000 SILT, FINE (UNDIFFERENTIATED)

4K1300 SILT, FINE, UNKNOWN TYPE, CLAY-SILT

4KH000 SILT, FINE, CLAY MINERAL (UNKNOWN TYPE)

4T0000 SHALE,ARGILLITE

4T3000 SILICEOUS (SANDY) SHALE
4T6000 FELSPATHIC SHALE

490000 SAND

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

500000 SEDIMENTARY (CHEMICAL)

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

600000 SEDIMENTARY (MARINE SEDIMENTS)

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

700000 MINERALS (AFTER IGS CLASSIFICATION)

7A0000 NATIVE ELEMENTS

7A5000 NON-METALS

7A5200 DIAMOND

7A5210 SILICATE DIAMOND INCLUSIONS

7A5211 GARNET DIAMOND INCLUSIONS
7A5212 OLIVINE DIAMOND INCLUSIONS
7A5213 LOW CA(<3%CAO) PYROXENE DIAMOND INCLUSIONS
7A5214 HIGH CA (>3%CAO) PYROXENE DIAMOND INCLUSIONS
7A5215 KYANITE DIAMOND INCLUSIONS
7A5216 QUARTZ DIAMOND INCLUSIONS

7A5220 OXIDE DIAMOND INCLUSIONS

7A5221 CHROMITE DIAMOND INCLUSIONS
7A5222 ILMENITE DIAMOND INCLUSIONS
7A5223 RUTILE DIAMOND INCLUSIONS
7A5224 SPINEL DIAMOND INCLUSIONS
7A5225 PERICLASE DIAMOND INCLUSIONS
7A5226 CORUNDUM DIAMOND INCLUSIONS
7A5227 MAGNETITE DIAMOND INCLUSIONS

7A5230 SULPHIDE DIAMOND INCLUSIONS

7A5231 PYRITE DIAMOND INCLUSIONS

TABLE 34 (CONTD).

7A5240 TWO-PHASE DIAMOND INCLUSIONS

7A5241 GARNET/OLIVINE DIAMOND INCLUSIONS
7A5242 LOW CA PYROXENE/GARNET DIAMOND INCLUSIONS
7A5243 HIGH CA PYROXENE/GARNET DIAMOND INCLUSIONS
7A5244 LOW CA PYROXENE/OLIVINE DIAMOND INCLUSIONS
7A5245 HIGH CA PYROXENE/OLIVINE DIAMOND INCLUSIONS
7A5246 LOW CA PYROXENE/HIGH CA PYROXENE DIAMOND INCLUSIONS

7A5250 THREE-PHASE DIAMOND INCLUSIONS

7D0000 OXIDES, HYDROXIDES, HYDROUS OXIDES, MULTIPLE OXIDES

7D3000 SIMPLE OXIDES OF FE AND AL

7D3400 CORUNDUM

7DH000 SPINEL GROUP, CHROMIUM SPINELS

7DH100 CHROMITE

7DI000 SPINEL GROUP, FERRIAN SPINELS

7DI200 MAGNETITE

7E0000 TITANATES, NIOBATES, TANTALATES

7E1000 TITANATES

7E1100 ILMENITE

7M0000 FELSPARS,FELSPATHOIDS,ZEOLITES AND ASSOCIATED MINERALS

7M1000 ALKALI FESLPAR (UNKNOWN TYPE)

TABLE 34 (CONTD).

7M1400 MICROCLINE

7M1410 MICROCLINE PERTHITE

7M2000 PLAGIOCLASE FELSPAR (UNKNOWN TYPE)
7M5000 ZEOLITE (UNKNOWN TYPE)
7MA000 UNDIFFERENTIATED FELSPARS

7MA100 PERTHITIC FELSPAR (UNDIFFERENTIATED)

7N0000 PYROXENES, PYROXENOIDS, AMPHIBOLES

7N1000 ORTHOPYROXENE (UNKNOWN TYPE)

7N1300 HYPERSTHENE

7N2000 DIOPSIDE-HEDENBERGITE GROUP (UNDIFFERENTIATED)
7N3000 AUGITE AND PIGEONITE GROUPS (UNDIFFERENTIATED)
7N4000 CLINOPYROXENE(UNDIFFERENTIATED AND TYPES NOT LISTED ABOVE)
7N5000 PYROXENOIDS

7P0000 MICACEOUS AND CLAY MINERALS

7P2000 BIOTITE, MISCELLANEOUS MICA MINERALS AND BRITTLE MICAS

7P2100 BIOTITE

7Q0000 OLIVINE, EPIDOTE, GARNET, SILLIMANITE GROUPS

7Q1000 OLIVINE GROUP
7Q3000 EPIDOTE GROUP

7Q3300 EPIDOTE S.S.

7Q4000 GARNET GROUP (UNDIFFERENTIATED)

TABLE 34 (CONTD).

7V0000 SILICATES (EXCEPT THOSE IN 7M TO 70) CONTAINING OTHER ANIONS

7V4000 BOROSILICATES

7V4000 TOURMALINE

7V4010 SCHORL TOURMALINE

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

800000 METEORITES

810000 CHONDRITES

811000 ENSTATITE CHONDRITE

811100 ENSTATITE CHONDRITE, TYPE I

811110 ENSTATITE CHONDRITE, TYPE I, NON-MAGNETIC FRACTION

811200 ENSTATITE CHONDRITE, INTERMEDIATE TYPE

811210 ENSTATITE CHONDRITE, INTERMEDIATE TYPE, NON-MAGNETIC FRACTION

811300 ENSTATITE CHONDRITE, TYPE II

811310 ENSTATITE CHONDRITE, TYPE II, NON-MAGNETIC FRACTION

812000 BRONZITE CHONDRITE

812100 BRONZITE CHONDRITE, NON-MAGNETIC FRACTION

813000 HYPERSTHENE CHONDRITE

813100 HYPERSTHENE CHONDRITE, NON-MAGNETIC FRACTION

814000 CARBONACEOUS CHONDRITE

814100 CARBONACEOUS CHONDRITE, TYPE CI

TABLE 34 (CONTD).

814200 CARBONACEOUS CHONDRITE, TYPE C2
814300 CARBONACEOUS CHONDRITE, TYPE C3

814310 CARBONACEOUS CHONDRITE, TYPE C3-V
814320 CARBONACEOUS CHONDRITE, TYPE C3-O

814400 CARBONACEOUS CHONDRITE, TYPE C4

814410 CARBONACEOUS CHONDRITE, TYPE C4-V
814420 CARBONACEOUS CHONDRITE, TYPE C4-O

815000 AMPHOTERITE CHONDRITE
816000 UNEQUILIBRATED CHONDRITE

820000 ACHONDRITES

821000 AUBRITE
822000 DIOGENITE
823000 CHASSIGNITE
824000 UREILITE
825000 ANGRITE
826000 NAKHLITE
827000 HOWARDITE
828000 EUCRITE

830000 STONY-IRONS

831000 PALLASITE
832000 SIDEROPHYRE
833000 LODRANITE
834000 MESOSIDERITE

834100 MESOSIDERITE - SILICATE FRACTION
834200 MESOSIDERITE - NON-MAGNETIC FRACTION

840000 IRONS

TABLE 34 (CONTD).

HIERARCHICAL LISTING OF ROCK TYPE CODES USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

900000 METAMORPHIC ROCKS.

TABLE 35.

LISTING OF ROCK NAMES (IN ALPHABETICAL ORDER) AND THEIR CORRESPONDING CODE NUMBERS AS USED IN THE GEOCHEMISTRY DEPARTMENT DATABASE AT U.C.T.

160000	A + P + F ROCKS. F=10-60% OF LIGHT COLOURED MINERALS.
260000	A + P + F ROCKS. F=10-60% OF LIGHT COLOURED MINERALS.
130000	A + P + Q ROCKS. Q=5-20% OF LIGHT COLOURED MINERALS.
230000	A + P + Q ROCKS. Q=5-20% OF LIGHT COLOURED MINERALS.
250000	A + P +- F ROCKS. F=0-10% OF LIGHT COLOURED MINERALS.
150000	A + P +- F ROCKS. F=0-10% OF LIGHT COLOURED MINERALS.
140000	A + P +- Q ROCKS. Q=0-5% OF LIGHT COLOURED MINERALS.
240000	A + P +- Q ROCKS. Q=0-5% OF LIGHT COLOURED MINERALS.
257150	ABSAROKITE
820000	ACHONDRITES
241100	AEGIRINE-AUGITE TRACHYTE
257300	ALKALI BASALT
322300	ALKALI BASALT, POTASSIC SERIES
321400	ALKALI BASALT, SODIC SERIES
7M1000	ALKALI FESLPAR (UNKNOWN TYPE)
257400	ALKALI MELABASALT
257100	ALKALI OLIVINE BASALT
257200	ALKALI OLIVINE MELABASALT
231000	ALKALI QUARTZ TRACHYTE
221000	ALKALI RHYOLITE
241000	ALKALI TRACHYTE
320000	ALKALINE ROCKS, VOLCANIC (CHEMICAL)
121000	ALKALI-FELSPAR GRANITE
131000	ALKALI-FELSPAR QUARTZ SYENITE
141000	ALKALI-FELSPAR SYENITE
195000	ALNOITE
147380	AMPHIBOLE GABBRO
122C00	AMPHIBOLE GRANITE

TABLE 35. (CONTD)

182500	AMPHIBOLE PERIDOTITE
182000	AMPHIBOLE PYROXENITE
182300	AMPHIBOLE ROCK
182400	AMPHIBOLE-BEARING DUNITE
147320	AMPHIBOLE-BEARING GABBRONORITE
182100	AMPHIBOLE-BEARING PERIDOTITE
182200	AMPHIBOLE-BEARING PYROXENITE
152200	AMPHIBOLE-NEPHELINE SYENITE
181810	AMPHIBOLITISED WEBSTERITE
815000	AMPHOTERITE CHONDRITE
163100	ANDESINE MONZODIORITE
246000	ANDESITE
312300	ANDESITE
825000	ANGRITE
283200	ANKARAMITE
322200	ANKARAMITE, POTASSIC SERIES
321200	ANKARAMITE, SODIC SERIES
148000	ANORTHOSITE
821000	AUBRITE
7N3000	AUGITE AND PIGEONITE GROUPS (UNDIFFERENTIATED)
257310	AUGITE BASALT
247220	BASALT
247240	BASALTIC KOMATIITE
311700	BASALTIC KOMATIITE
311720	BASALTIC KOMATIITE, BADPLAAS TYPE
311710	BASALTIC KOMATIITE, BARBERTON TYPE
311730	BASALTIC KOMATIITE, GELUK TYPE
247000	BASALTIC ROCKS
247100	BASALTIC ROCKS - PLAG + PYX + OL
247300	BASALTIC ROCKS - PLAG + PYX + AMPHIBOLE
247200	BASALTIC ROCKS - PLAG + PYX
1A1200	BEFORSITE
244200	BENMOREITE

TABLE 35. (CONTD)

321700	BENMORITE
7P2100	BIOTITE
122700	BIOTITE GRANITE
244300	BIOTITE LATITE ANDESITE
244110	BIOTITE MUGEARITE
147283	BIOTITE ORTHOPYROXENE GABBRO
7P2000	BIOTITE, MISCELLANEOUS MICA MINERALS AND BRITTLE MICAS
7V4000	BOROSILICATES
143100	BOSTONITE
812000	BRONZITE CHONDRITE
812100	BRONZITE CHONDRITE, NON-MAGNETIC FRACTION
312000	CALC-ALKALINE SERIES
191000	CAMPTONITE
152600	CANCRINITE SODALITE SYENITE
814000	CARBONACEOUS CHONDRITE
814100	CARBONACEOUS CHONDRITE, TYPE C1
814200	CARBONACEOUS CHONDRITE, TYPE C2
814300	CARBONACEOUS CHONDRITE, TYPE C3
814310	CARBONACEOUS CHONDRITE, TYPE C3-V
814320	CARBONACEOUS CHONDRITE, TYPE C3-O
814400	CARBONACEOUS CHONDRITE, TYPE C4
814410	CARBONACEOUS CHONDRITE, TYPE C4-V
814420	CARBONACEOUS CHONDRITE, TYPE C4-O
1A1000	CARBONATITE
2A1000	CARBONATITE
341000	CARBONATITE
823000	CHASSIGNITE
810000	CHONDRITES
7DH100	CHROMITE
7A5221	CHROMITE DIAMOND INCLUSIONS
1A3100	CHROMITITE
188300	CLINOPYROXENE XENOLITH
188500	CLINOPYROXENE-ILMENITE XENOLITH

TABLE 35. (CONTD)

7N4000	CLINOPYROXENE(UNDIFFERENTIATED AND TYPES NOT LISTED ABOVE)
181A00	CLINOPYROXENITE
122800	COARSE-GRAINED GRANITE
221100	COMENDITE
332000	COMENDITE
212300	COMENDITIC OBSIDIAN
7D3400	CORUNDUM
7A5226	CORUNDUM DIAMOND INCLUSIONS
184120	CORUNDUM ECLOGITE
188120	CORUNDUM ECLOGITE XENOLITH
224000	DACITE
312400	DACITE
7A5200	DIAMOND
822000	DIOGENITE
7N2000	DIOPSIDE-HEDENBERGITE GROUP (UNDIFFERENTIATED)
146000	DIORITE
1472A0	DOLERITE
181300	DUNITE
184100	ECLOGITE
188100	ECLOGITE XENOLITH
811000	ENSTATITE CHONDRITE
811200	ENSTATITE CHONDRITE, INTERMEDIATE TYPE
811210	ENSTATITE CHONDRITE, INTERMEDIATE TYPE, NON-MAGNETIC FRACTION
811100	ENSTATITE CHONDRITE, TYPE I
811300	ENSTATITE CHONDRITE, TYPE II
811310	ENSTATITE CHONDRITE, TYPE II, NON-MAGNETIC FRACTION
811110	ENSTATITE CHONDRITE, TYPE I, NON-MAGNETIC FRACTION
7Q3000	EPIDOTE GROUP
7Q3300	EPIDOTE S.S.
292000	ERUPTIVE BRECCIA
1472B0	EUCRITE
828000	EUCRITE
270000	F +- A +- P ROCKS F=60-100% OF LIGHT COLOURED MINERALS.

TABLE 35. (CONTD)

170000	F +- A +- P ROCKS. F=60-100% OF LIGHT COLOURED MINERALS.
122210	FAYALITE GRANOPHYRE
291000	FELSIC TUFF
227000	FELSITE
125200	FELSPAR PORPHYRY
226200	FELSPAR PORPHYRY
7M0000	FELSPARS,FELSPATHOIDS,ZEOLITES AND ASSOCIATED MINERALS
4T6000	FELSPATHIC SHALE
175000	FERGUSITE
247221	FERROBASALT
146200	FERRODIORITE
147281	FERROGABBRO
122900	FINE-GRAINED GRANITE (APLITE)
165000	FOID DIORITE (THERALITE)
166000	FOID GABBRO (THERALITE)
163000	FOID MONZODIORITE (ESSEXITE)
164000	FOID MONZOGABBRO (ESSEXITE)
162000	FOID MONZOSYENITE
161000	FOID SYENITE (FOYAITE)
251000	FOID-BEARING ALKALI TRACHYTE
151000	FOID-BEARING ALKALI-FELSPAR SYENITE
256000	FOID-BEARING ANDESITE (ALKALI ANDESITE)
257000	FOID-BEARING BASALTIC ROCKS (ALKALI BASALTIC ROCKS)
156000	FOID-BEARING DIORITE
157000	FOID-BEARING GABBRO
253000	FOID-BEARING LATITE
254000	FOID-BEARING LATITE ANDESITE
255000	FOID-BEARING LATITE BASALT
154000	FOID-BEARING MONZODIORITE
155000	FOID-BEARING MONZOGABBRO
153000	FOID-BEARING MONZONITE
152000	FOID-BEARING SYENITE
252000	FOID-BEARING TRACHYTE

TABLE 35. (CONTD)

290000	FRAGMENTAL ROCKS
147280	GABBRO
147000	GABBROID ROCKS
147200	GABBROID ROCKS - PLAG + PYX
147100	GABBROID ROCKS - PLAG + PYX + OL
147300	GABBROID ROCKS - PLAG + PYX + AMPHIBOLE
147250	GABBRONORITE
1471E2	GABBRO-PICRITE
7A5211	GARNET DIAMOND INCLUSIONS
7Q4000	GARNET GROUP (UNDIFFERENTIATED)
181520	GARNET LHERZOLITE
188810	GARNET LHERZOLITE XENOLITH
188710	GARNET WEBSTERITE XENOLITH
188600	GARNET XENOLITH
181510	GARNET-BEARING LHERZOLITE
7A5241	GARNET/OLIVINE DIAMOND INCLUSIONS
210000	GLASSY ROCKS WITH NO PHENOCRYSTS
122000	GRANITE
125000	GRANITOID PORPHYRY
123000	GRANODIORITE
122200	GRANOPHYRE
4DD000	GREYWACKE
4BD300	GREYWACKE CLAY-SILT
4BD000	GREYWACKE MEDIUM SAND
181600	HARZBURGITE
257110	HAWAIITE
321500	HAWAIITE
7A5243	HIGH CA PYROXENE/GARNET DIAMOND INCLUSIONS
7A5245	HIGH CA PYROXENE/OLIVINE DIAMOND INCLUSIONS
7A5214	HIGH CA (>3%CAO) PYROXENE DIAMOND INCLUSIONS
312100	HIGH-ALUMINA BASALT
312320	HIGH-K ANDESITE
247310	HORNBLENDE BASALT (YAMASKITE)

TABLE 35. (CONTD)

147381	HORNBLENDE GABBRO
122C10	HORNBLENDE GRANITE
182510	HORNBLENDE PERIDOTITE
182D10	HORNBLENDE PYROXENITE
124200	HORNBLENDE TONALITE
242100	HORNBLENDE TRACHYTE
182410	HORNBLENDE-BEARING DUNITE
147321	HORNBLENDE-BEARING GABBRONORITE
182110	HORNBLENDE-BEARING PERIDOTITE
182210	HORNBLENDE-BEARING PYROXENITE
182310	HORNBLENDITE
181310	HORTONOLITE DUNITE
827000	HOWARDITE
7N1300	HYPERSTHENE
813000	HYPERSTHENE CHONDRITE
813100	HYPERSTHENE CHONDRITE, NON-MAGNETIC FRACTION
311400	ICELANDITE
224100	ICELANDITE (FERRODACITE)
172000	IJOLITE
7E1100	ILMENITE
7A5222	ILMENITE DIAMOND INCLUSIONS
188400	ILMENITE XENOLITH
840000	IRONS
174000	ITALITE
172100	JACUPIRANGITE
187000	KIMBERLITE
284000	KIMBERLITE
187300	KIMBERLITE, CARBONATITIC
284300	KIMBERLITE, CARBONATITIC
187100	KIMBERLITE, MICA-RICH
284100	KIMBERLITE, MICA-RICH
187200	KIMBERLITE, NON-MICACEOUS
284200	KIMBERLITE, NON-MICACEOUS

TABLE 35. (CONTD)

187400	KIMBERLITE, NON-MICACEOUS CARBONATE-RICH
284400	KIMBERLITE, NON-MICACEOUS CARBONATE-RICH
188000	KIMBERLITIC XENOLITHS
7A5215	KYANITE DIAMOND INCLUSIONS
184110	KYANITE ECLOGITE
188110	KYANITE ECLOGITE XENOLITH
246100	LABRADORITE ANDESITE
190000	LAMPROPHYRES
243000	LATITE
244000	LATITE ANDESITE (TRACHYANDESITE)
245000	LATITE BASALT (TRACHYBASALT)
2A1100	LENGAITE
322700	LEUCITE-PHONOLITE
274000	LEUCITITE
147370	LEUCO AMPHIBOLE GABBRO
147310	LEUCO AMPHIBOLE-BEARING GABBRONORITE
126100	LEUCO BIOTITE TONALITE
147270	LEUCO GABBRO
147240	LEUCO GABBRONORITE
122300	LEUCO GRANOPHYRE
147371	LEUCO HORNBLENDE GABBRO
147311	LEUCO HORNBLENDE-BEARING GABBRONORITE
147210	LEUCO NORITE
147110	LEUCO OLIVINE-BEARING GABBRONORITE
147100	LEUCO OLIVINE-GABBRO
147140	LEUCO OLIVINE-GABBRONORITE
1471A0	LEUCO OLIVINE-NORITE
147340	LEUCO PYROXENE AMPHIBOLE GABBRONORITE
147341	LEUCO PYROXENE HORNBLENDE GABBRONORITE
126000	LEUCO TONALITE
147170	LEUCO TROCTOLITE
192000	LEUCOCAMPTONITE
122100	LEUCOGRANITE (ALASKITE)

TABLE 35. (CONTD)

181500	LHERZOLITE
188800	LHERZOLITE XENOLITH
281100	LIMBURGITE
833000	LODRANITE
7A5242	LOW CA PYROXENE/GARNET DIAMOND INCLUSIONS
7A5246	LOW CA PYROXENE/HIGH CA PYROXENE DIAMOND INCLUSIONS
7A5244	LOW CA PYROXENE/OLIVINE DIAMOND INCLUSIONS
7A5213	LOW CA(<3%CAO) PYROXENE DIAMOND INCLUSIONS
312310	LOW-K ANDESITE
312200	LOW-SILICA ANDESITE
7D1200	MAGNETITE
7A5227	MAGNETITE DIAMOND INCLUSIONS
1A3200	MAGNETITE ROCK
4B0000	MEDIUM SAND
122A00	MEDIUM-GRAINED GRANITE
147390	MELA AMPHIBOLE GABBRO
147330	MELA AMPHIBOLE-BEARING GABBRONORITE
147290	MELA GABBRO
147260	MELA GABBRONORITE
122400	MELA GRANOPHYRE
147391	MELA HORNBLENDE GABBRO
147331	MELA HORNBLENDE-BEARING GABBRONORITE
147230	MELA NORITE
147130	MELA OLIVINE-BEARING GABBRONORITE
1471F0	MELA OLIVINE-GABBRO
147160	MELA OLIVINE-GABBRONORITE
1471C0	MELA OLIVINE-NORITE
147360	MELA PYROXENE AMPHIBOLE GABBRONORITE
147361	MELA PYROXENE HORNBLENDE GABBRONORITE
127000	MELA TONALITE
147190	MELA TROCTOLITE
247230	MELABASALT
193000	MELACAMPTONITE

TABLE 35. (CONTD)

273200	MELILITE NEPHELINITE
185100	MELILITITE
285100	MELILITITE
173000	MELTEIGITE
834000	MESOSIDERITE
834200	MESOSIDERITE - NON-MAGNETIC FRACTION
834100	MESOSIDERITE - SILICATE FRACTION
900000	METAMORPHIC ROCKS.
800000	METEORITES
7P0000	MICACEOUS AND CLAY MINERALS
7M1400	MICROCLINE
7M1410	MICROCLINE PERTHITE
700000	MINERALS (AFTER IGS CLASSIFICATION)
176000	MISSOURITE
194000	MONCHIQUITE
144000	MONZODIORITE
145000	MONZOGABBRO
122600	MONZOGRANITE
143000	MONZONITE
321600	MUGEARITE
244100	MUGEARITE (OLIVINE LATITE ANDESITE)
826000	NAKHLITE
7A0000	NATIVE ELEMENTS
152500	NEPHELINE CANCRINITE SODALITE SYENITE
166100	NEPHELINE GABBRO
274100	NEPHELINE LEUCITITE
185110	NEPHELINE MELILITITE
194100	NEPHELINE MONCHIQUITE
157200	NEPHELINE OLIVINE DOLERITE
157100	NEPHELINE OLIVINE GABBRO
152300	NEPHELINE-AMPHIBOLE-PYROXENE SYENITE
157400	NEPHELINE-BEARING OLIVINE DOLERITE
157300	NEPHELINE-BEARING OLIVINE GABBRO

TABLE 35. (CONTD)

152100	NEPHELINE-CANCRINITE-PYROXENE SYENITE
152400	NEPHELINE-SYENITE
177000	NEPHELINITE
273000	NEPHELINITE
321300	NEPHELINITE
7A5000	NON-METALS
1A0000	NON-SILICATE ROCKS
2A0000	NON-SILICATE ROCKS
340000	NON-SILICATE ROCKS
141100	NORDMARKITE
147220	NORITE
148200	NORITIC ANORTHOSITE
212000	OBSIDIAN
283100	OCEANITE
163200	OLIGOCLASE MONZODIORITE
182A00	OLIVINE AMPHIBOLE PYROXENITE
182800	OLIVINE AMPHIBOLE ROCK
257120	OLIVINE AUGITE BASALT
247110	OLIVINE BASALT
181700	OLIVINE CLINOPYROXENITE
7A5212	OLIVINE DIAMOND INCLUSIONS
1471G0	OLIVINE DOLERITE
1471E1	OLIVINE FERROGABBRO
7G1000	OLIVINE GROUP
182A10	OLIVINE HORNBLENDE PYROXENITE
182810	OLIVINE HORNBLENDITE
243100	OLIVINE LATITE
247120	OLIVINE MELABASALT
185120	OLIVINE MELILITITE
285110	OLIVINE MELILITITE
273100	OLIVINE NEPHELINITE
1471E4	OLIVINE ORTHOPYROXENE FERROGABBRO
1471E3	OLIVINE ORTHOPYROXENE GABBRO

TABLE 35. (CONTD)

182900	OLIVINE PYROXENE AMPHIBOLE ROCK
182910	OLIVINE PYROXENE HORNBLENDITE
264100	OLIVINE TEPHRITE (BASANITE)
247130	OLIVINE THOLEIITE BASALT
147284	OLIVINE-BEARING GABBRO
147120	OLIVINE-BEARING GABBRONORITE
1471E0	OLIVINE-GABBRO
147150	OLIVINE-GABBRONORITE
1471B0	OLIVINE-NORITE
181900	OLIVINE-ORTHOPYROXENITE
182B00	OLIVINE-PYROXENITE
181800	OLIVINE-WEBSTERITE
7Q0000	OLIVINE, EPIDOTE, GARNET, SILLIMANITE GROUPS
147282	ORTHOPYROXENE FERROGABBRO
7N1000	ORTHOPYROXENE (UNKNOWN TYPE)
181C00	ORTHOPYROXENITE
7A5220	OXIDE DIAMOND INCLUSIONS
1A3000	OXIDE ROCKS
7D0000	OXIDES, HYDROXIDES, HYDROUS OXIDES, MULTIPLE OXIDES
831000	PALLASITE
221200	PANTELLARITE
331000	PANTELLERITE
330000	PERALKALINE ROCKS
7A5225	PERICLASE DIAMOND INCLUSIONS
181100	PERIDOTITE
188A00	PERIDOTITE XENOLITH
281200	PERIDOTITIC KOMATIITE
311600	PERIDOTITIC KOMATIITE
7MA100	PERTHITIC FELSPAR (UNDIFFERENTIATED)
188200	PHLOGOPITE XENOLITH
261000	PHONOLITE
321900	PHONOLITE
271000	PHONOLITIC FOIDITES

TABLE 35. (CONTD)

271100	PHONOLITIC NEPHELINITE
263000	PHONOLITIC TEPHRITE
183B00	PICRITE
283300	PICRITE
322100	PICRITE BASALT, POTASSIC SERIES
321100	PICRITE BASALT, SODIC SERIES
247111	PICRITIC BASALT
211000	PITCHSTONE
7M2000	PLAGIOCLASE FELSPAR (UNKNOWN TYPE)
247211	PLAGIOCLASE (PHYRIC) THOLEIITE BASALT
183200	PLAGIOCLASE-BEARING CLINOPYROXENITE
183100	PLAGIOCLASE-BEARING DUNITE
183700	PLAGIOCLASE-BEARING HARZBURGITE
183A00	PLAGIOCLASE-BEARING LHERZOLITE
183300	PLAGIOCLASE-BEARING OLIVINE-CLINOPYROXENITE
183600	PLAGIOCLASE-BEARING OLIVINE-ORTHOPYROXENITE
183900	PLAGIOCLASE-BEARING OLIVINE-WEBSTERITE
183500	PLAGIOCLASE-BEARING ORTHOPYROXENITE
183C00	PLAGIOCLASE-BEARING PYROXENITE
183800	PLAGIOCLASE-BEARING WEBSTERITE
183400	PLAGIOCLASE-BEARING WEHRLITE
100000	PLUTONIC AND HYPABYSSAL
226000	PORPHYRY
322000	POTASSIC SERIES, VOLCANIC (CHEMICAL)
151100	PULASKITE
7A5231	PYRITE DIAMOND INCLUSIONS
147350	PYROXENE AMPHIBOLE GABBRONORITE
182600	PYROXENE AMPHIBOLE PERIDOTITE
182C00	PYROXENE AMPHIBOLE ROCK
146100	PYROXENE DIORITE
122D00	PYROXENE GRANITE (CHARNOCKITE)
147351	PYROXENE HORNBLENDE GABBRONORITE
182610	PYROXENE HORNBLENDE PERIDOTITE

TABLE 35. (CONTD)

182C10	PYROXENE HORNBLENDITE
7N0000	PYROXENES, PYROXENOIDS, AMPHIBOLES
182700	PYROXENE-PERIDOTITE
181200	PYROXENITE
188900	PYROXENITE XENOLITH
7N5000	PYROXENOIDS
120000	Q + A + P ROCKS. Q=20-60% OF LIGHT COLOURED MINERALS.
220000	Q + A + P ROCKS. Q=20-60% OF LIGHT COLOURED MINERALS.
236000	QUARTZ ANDESITE
138000	QUARTZ ANORTHOSITE
237000	QUARTZ BASALT
7A5216	QUARTZ DIAMOND INCLUSIONS
136000	QUARTZ DIORITE
139000	QUARTZ DOLERITE
125100	QUARTZ FELSPAR PORPHYRY
226100	QUARTZ FELSPAR PORPHYRY
137000	QUARTZ GABBRO
233000	QUARTZ LATITE
234000	QUARTZ LATITE ANDESITE
235000	QUARTZ LATITE BASALT
134000	QUARTZ MONZODIORITE
135000	QUARTZ MONZOGABBRO
133000	QUARTZ MONZONITE (ADAMELLITE)
13A000	QUARTZ NORITE
110000	QUARTZ ROCKS. Q=60-100% OF LIGHT COLOURED MINERALS.
132000	QUARTZ SYENITE
232000	QUARTZ TRACHYTE
111000	QUARTZOLITE
225000	QUARTZ-ANDESITE
112000	QUARTZ-RICH GRANITOIDS
311300	QUARTZ-THOLEIITE
223000	RHYODACITE
312500	RHYODACITE

TABLE 35. (CONTD)

222000	RHYOLITE
312600	RHYOLITE
212100	RHYOLITIC OBSIDIAN
7A5223	RUTILE DIAMOND INCLUSIONS
490000	SAND
490000	SAND (UNKNOWN TYPE)
4D0000	SANDSTONE (UNKNOWN TYPE)
7V4D10	SCHORL TOURMALINE
500000	SEDIMENTARY (CHEMICAL)
400000	SEDIMENTARY (CLASTIC)
600000	SEDIMENTARY (MARINE SEDIMENTS)
181610	SERPENTINISED HARZBURGITE
181110	SERPENTINISED PERIDOTITE
181410	SERPENTINISED WEHRLITE
186000	SERPENTINITE
286000	SERPENTINITE
4T0000	SHALE,ARGILLITE
257140	SHOSHONITE
832000	SIDEROPHYRE
7A5210	SILICATE DIAMOND INCLUSIONS
7V0000	SILICATES (EXCEPT THOSE IN 7M TO 70) CONTAINING OTHER ANIONS
4T3000	SILICEOUS (SANDY) SHALE
4K0000	SILT, FINE (UNDIFFERENTIATED)
4KH000	SILT, FINE, CLAY MINERAL (UNKNOWN TYPE)
4K1300	SILT, FINE, UNKNOWN TYPE, CLAY-SILT
7D3000	SIMPLE OXIDES OF FE AND AL
161110	SODALITE TINGUAITE
321000	SODIC SERIES, VOLCANIC (CHEMICAL)
321800	SODIC TRACHYTE
1A1100	SOVITE
7A5224	SPINEL DIAMOND INCLUSIONS
7DH000	SPINEL GROUP, CHROMIUM SPINELS
7D1000	SPINEL GROUP, FERRIAN SPINELS

TABLE 35. (CONTD)

830000	STONY-IRONS
310000	SUBALKALINE ROCKS
4DC000	SUBGREYWACKE
4BC300	SUBGREYWACKE CLAY-SILT
4BC000	SUBGREYWACKE MEDIUM SAND
7A5230	SULPHIDE DIAMOND INCLUSIONS
1A2000	SULPHIDE ROCKS
142000	SYENITE
122500	SYENOGRANITE
254100	TAHITITE
264000	TEPHRITE
272000	TEPHRITIC FOIDITES
262000	TEPHRITIC PHONOLITE
311200	THOLEIITE
247210	THOLEIITE BASALT
311100	THOLEIITIC PICRITE
311500	THOLEIITIC RHYOLITE
311000	THOLEIITIC SERIES
7A5250	THREE-PHASE DIAMOND INCLUSIONS
161100	TINGUAITE
7E1000	TITANATES
7E0000	TITANATES, NIOBATES, TANTALATES
124000	TONALITE
7V4D00	TOURMALINE
322400	TRACHYBASALT
242000	TRACHYTE
322600	TRACHYTE
212200	TRACHYTIC OBSIDIAN
257130	TRISTANITE
322500	TRISTANITE
147180	TROCTOLITE
148100	TROCTOLITIC ANORTHOSITE
122800	TWO MICA GRANITE

TABLE 35. (CONTD)

7A5240	TWO-PHASE DIAMOND INCLUSIONS
280000	ULTRAMAFIC ROCKS M=90-100
180000	ULTRAMAFIC ROCKS M=90-100
181000	ULTRAMAFIC ROCKS COMPOSED OF OLIVINE AND PYROXENE
281000	ULTRAMAFIC ROCKS COMPOSED OF OLIVINE + PYROXENE.
282000	ULTRAMAFIC ROCKS COMPOSED OF OLIVINE + PYROXENE + AMPHIBOLE
283000	ULTRAMAFIC ROCKS COMPOSED OF OLIVINE + PYROXENE + PLAGIOCLASE.
182000	ULTRAMAFIC ROCKS CONTAINING AMPHIBOLE. OL+PYX+AMPH+(BI+GAR+SP)>=95%
185000	ULTRAMAFIC ROCKS CONTAINING MELILITE
285000	ULTRAMAFIC ROCKS CONTAINING MELILITE.
184000	ULTRAMAFIC ROCKS CONTAINING NO OLIVINE
183000	ULTRAMAFIC ROCKS CONTAINING PLAGIOCLASE - OL+PYX+PLAG
7MA000	UNDIFFERENTIATED FELSPARS
816000	UNEQUILIBRATED CHONDRITE
824000	UREILITE
171000	URTITE
300000	VOLCANIC ROCKS (CHEMICAL CLASSIFICATION)
200000	VOLCANIC ROCKS (MINERALOGICAL CLASSIFICATION)
181800	WEBSTERITE
188700	WEBSTERITE XENOLITH
181400	WEHRLITE
7M5000	ZEOLITE (UNKNOWN TYPE)

TABLE 36A.

GALLIUM IN MINERALS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
PLAGIOCLASE ET3/169	20.4		N.A.	.5	.20	1.0		PYROXENITE
PLAGIOCLASE ME-6	22.5		N.A.	.5	.18	.8		BIOTITE NORITE
PLAGIOCLASE ME-7	20.3		N.A.	.5	.20	1.0		BIOTITE NORITE
PLAGIOCLASE ME-7 SCHILL	19.6		N.A.	.6	.21	1.0		BIOTITE NORITE
PLAGIOCLASE ME-8	18.8		N.A.	.5	.19	1.0		BIOTITE NORITE
PLAGIOCLASE ME-9	20.1		N.A.	.5	.19	1.0		BIOTITE NORITE
PLAGIOCLASE DS-50	24.0		N.A.	.5	.20	.8		DOLERITE
PLAGIOCLASE 5087	24.5		N.A.	.5	.20	.8		NORITE
PLAGIOCLASE NOR-1	31.6		N.A.	.5	.21	.6		NORITE
PLAGIOCLASE NOR-2	29.5		N.A.	.5	.20	.7		HYPERSTHENITE
PLAGIOCLASE NOR-8	28.8		N.A.	.5	.20	.7		BIOTITE ANORTHOSITE
PYROXENE ET3/169	3.0		N.A.	.3	.11	3.5		PYROXENITE
PYROXENE ME-7	3.0		N.A.	.4	.11	3.8		BIOTITE NORITE
PYROXENE ME-8	2.8		N.A.	.4	.12	4.3		BIOTITE NORITE
PYROXENE ME-9	5.2		N.A.	.4	.12	2.3		BIOTITE NORITE
PYROXENE 5087	4.2		N.A.	.4	.11	2.7		NORITE
PYROXENE DS-50	5.5		N.A.	.4	.12	2.2		DOLERITE
ORTHOPYROXENE SD-76	.9	1.70	.53	.3	.08	8.5		PYROXENITE
CLINOPYROXENE M (A)	6.1	4.61	1.33	.3	.11	1.7		KIMBERLITE MEGACRYST
CLINOPYROXENE JJG 248	10.3	11.81	.87	.3	.11	1.1		KIMBERLITE MEGACRYST
HYPERSTHENE NOR-1	14.1		N.A.	.5	.17	1.2		NORITE
HYPERSTHENE NOR-2	13.4		N.A.	.6	.21	1.5		NORITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 36B.

GALLIUM IN MINERALS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MICROCLINE PERTHITE IKF	15.0	1.50	9.98	.4	.16	1.0		GRANITE
MICROCLINE PERTHITE ISF	13.5	1.50	8.99	.5	.19	1.4		GRANITE
MICROCLINE PERTHITE IMF	13.0	1.42	9.18	.4	.16	1.2		GRANITE
BIOTITE IKF	58.3	5.95	9.79	1.0	.39	.7		GRANITE
BIOTITE ISF	65.5	6.63	9.88	1.0	.41	.6		GRANITE
BIOTITE IMF	66.0	6.65	9.92	1.0	.41	.6		GRANITE
GARNET, ORAPA	9.1	.78	11.64	.3	.09	1.0		PERIDOTITE
GARNET, ORAPA	9.8	.81	12.17	.3	.10	1.0		ECLOGITE
GARNET, BOBBEJAAN	8.6	.80	10.81	.4	.11	1.3		KIMBERLITE MEGACRYST
GARNET, RIETFONTEIN	5.3	.56	9.42	.3	.09	1.7		PERIDOTITE
GARNET, MONASTERY M(D)	12.9	1.15	11.24	.3	.11	.9		KIMBERLITE MEGACRYST
EPIDOTE	33.7	2.54	13.25	1.1	.37	1.1		AMPHIBOLITE
ZEOLITE KLS18 HEULANDITE	4.9		N.A.	.4	.13	2.7		BASALT
CORUNDUM	100.2	1.89	52.92	.7	.31	.3		UNKNOWN
SCHORL TOURMALINE	28.8	1.61	17.86	.7	.26	.9		METAMORPHOSED PERALUMINOUS ROCK
SCHORL TOURMALINE	36.7	2.04	17.96	.8	.28	.8		PEGMATITE
OLIVINE	< .3		N.A.	.3				UNKNOWN

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 36C.

GALLIUM IN MINERALS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ILMENITE	19.8		N.A.	.7	.24	1.2		KIMBERLITE
ILMENITE M(C)	20.6	41.31	.50	.7	.24	1.2		KIMBERLITE MEGACRYST
ILMENITE, MONASTERY MINE	16.9		N.A.	.6	.20	1.2		KIMBERLITE
ILMENITE, SILVERTON MINE	15.6		N.A.	.6	.20	1.3		KIMBERLITE
ILMENITE, RIETFONTEIN	18.2		N.A.	.4	.13	.7		KIMBERLITE
SPINEL, RIETFONTEIN MINE	28.8	3.06	9.39	.3	.30	1.0		KIMBERLITE
CHROMITE, RUIGHOEK MINE	48.6		N.A.	1.2	.45	.9		CHROMITE BANDS, B.I.C.
CHROMITE, SWARTKOP MINE	36.0		N.A.	.8	.30	.8		CHROMITE BANDS, B.I.C.
CHROMITE, SWARTKOP MINE	40.9		N.A.	1.0	.37	.9		CHROMITE BANDS, B.I.C.
CHROMITE, DRIEKOP MINE	57.6		N.A.	1.2	.45	.8		CHROMITE BANDS, B.I.C.
CHROMITE, GRASVALLY MINE	18.1		N.A.	.5	.17	.9		CHROMITE BANDS, B.I.C.
MAGNETITE, MAGNET HTS.	48.9		N.A.	1.1	.40	.8		MAGNETITE BANDS, B.I.C.
MAGNETITE, PRETORIA DIST	53.7		N.A.	1.0	.39	.7		MAGNETITE BANDS, B.I.C.
MAGNETITE, MAGNET HTS.	54.0		N.A.	1.5	.56	1.0		LOWER SEAM 1, MAGNETITE BANDS, B.I.C.
MAGNETITE, MAGNET HTS.	52.0		N.A.	1.5	.57	1.1		MAIN MAGNETITE SEAM, B.I.C.
MAGNETITE, MAGNET HTS.	52.7		N.A.	1.5	.57	1.1		SEAM 2, MAGNETITE BANDS, B.I.C.

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 37A

Ga CONTENTS OF SOME IMPORTANT ROCK-FORMING MINERALS
...ABSTRACTED FROM THE LITERATURE AND THIS WORK

Mineral	n	Ga ppm		Ga/Al x 10000		n
		Range	Mean	Mean	Range	
Alkali feldspar	21	5-12	9	0.9	---	21
K-feldspar	157	2-30	14	1.3	0.2-3.1	55
Orthoclase	21	9-30	15	1.0	---	14
Microcline	56	3-88	31	2.8	0.7-5.6	23
Perthite	16	30-50	33	2.8	2.7-4.8	16
Microcline perthite	27	20-70	33	3.4	---	20
Plagioclase	164	10-110	31	2.0	0.9-4.1	103
This work	11	19-32	24	---	---	---
Albite	157	10-110	31	3.8	1.0-9.8	30
Andesine, labradorite, bytownite	7	20-25	20	1.0	---	1
Nepheline	12	34-140	85	5.2	4.2-5.7	7
Muscovite	90	27-200	79	4.7	1.7-10.0	70
Biotite	218	10-339	49	5.5	1.4-13.3	170
This work	3	58-66	63	6.4	6.0-6.7	3
Phlogopite	6	---	43	---	---	---
Chlorite	9	35-48	39	3.5	2.9-4.0	8
Actinolite	1	---	4	0.9	---	1
Hornblende	82	2-50	17	4.1	0.2-8.9	72
Orthopyroxene	30	2-30	13	5.5	1.9-37.3	30
This work	1	---	1	1.7	---	1
Hypersthene	10	1-10	5	3.4	1.3-7.3	10
This work	2	13-14	14	---	---	---
Clinopyroxene	28	1-20	11	5.8	1.6-12.5	28
This work	2	6-10	8	8.2	4.6-11.8	2
Pyroxene	15	1-12	6	2.5	0.5-4.7	6
This work	6	3-6	4	---	---	---
Diopside	14	1-13	6	3.2	0.6-5.8	14
Augite	10	1-23	11	2.4	1.3-3.9	4

contd.

TABLE 37B

Mineral	n	Ga ppm Range	Ga ppm Mean	Ga/Al x 10000 Mean	Ga/Al x 10000 Range	n
Garnet	37	1-19	8	0.7	0.4-3.0	34
This work	5	6-13	9	0.8	0.6-1.2	5
Olivine	12	1-5	2	---	---	---
This work	1	---	<0.3	---	---	---
Andalusite	18	8-210	63	2.2	0.2-2.5	8
Sillimanite	10	31-95	63	2.0	---	6
Kyanite	46	10-158	36	0.9	0.8-1.1	29
Epidote	7+	4-57	25+	---	---	---
This work	1	---	34	2.5	---	1
Corundum	2	0-100	50	---	---	---
This work	1	---	100	1.9	---	1
Tourmaline	24	14-90	69	4.2	2.9-5.2	18
This work	2	29-37	33	1.8	1.6-2.0	2
Quartz	64	.01-6	0.6	---	---	---
Magnetite	47	10-120	63	---	---	---
This work	5	49-54	52	---	---	---
Chromite	8	4-18	7	---	---	---
This work	5	18-58	40	---	---	---
Ilmenite	19	1-9	2	---	---	---
This work	5	16-21	18	---	---	---
Titanomagnetite	8	7-80	68	---	---	---
Haematite	4	1-2	2	---	---	---
Goethite	1	---	1	---	---	---
Limonite	2	1-6	3	---	---	---
Rutile	1	---	2	---	---	---
Spinel	1	---	45	---	---	---
This work	1	---	29	3.1	---	1
Calcite	4	0.1-0.5	0.3	---	---	---
Dolomite	1	---	0.1	---	---	---

TABLE 38.

STATISTICAL INFORMATION ON GA, AL AND GA/AL RATIO DISTRIBUTIONS IN ROCKS AND MINERALS ANALYSED IN THIS WORK.
NO. OF SAMPLES IN BRACKETS. MEDIAN VALUES ARE REPORTED WHEN 3 OR MORE SAMPLES ARE PRESENT IN A GROUP,
AND MODAL VALUES WHEN 15 OR MORE SAMPLES ARE PRESENT.

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
100000 PLUTONIC AND HYPABYSSAL ROCKS	14.8(811)	15.5	15.7	<.3-45.8	2.61(662)	.46-41.31	6.65(662)	.01-15.97
120000 Q + A + P ROCKS	19.5(93)	18.3	18.5	9.4-38.9	2.53(75)	1.50- 5.81	7.66(75)	5.92- 9.20
121000 ALKALI-FELSPAR GRANITE	12.2(2)	.0	.0	11.4-13.0	1.89(2)	1.80- 1.98	6.99(2)	6.33- 6.59
122000 GRANITES	19.8(64)	18.3	18.5	9.4-38.9	2.58(48)	1.50- 5.81	7.68(48)	5.92- 9.20
122200 GRANOPHYRES	24.4(10)	27.0	.0	16.2-34.2	4.56(2)	3.90- 5.22	6.68(2)	6.55- 6.81
122210 FAYALITE GRANOPHYRE	18.7(1)	.0	.0	18.7-18.7	.00(0)	.00- .00	.00(0)	.00- .00
122300 LEUCO GRANOPHYRE	16.3(1)	.0	.0	16.3-16.3	.00(0)	.00- .00	.00(0)	.00- .00
122400 MELA GRANOPHYRE	34.4(1)	.0	.0	34.4-34.4	.00(0)	.00- .00	.00(0)	.00- .00
122600 MONZOGRANITES	16.9(8)	15.2	.0	14.2-23.3	2.14(8)	1.93- 2.71	7.85(8)	7.03- 8.79
122700 BIOTITE GRANITE	17.7(4)	17.4	.0	16.4-19.8	2.48(4)	2.20- 3.22	7.26(4)	6.14- 8.24
122800 TBO MICA GRANITE	20.7(2)	.0	.0	18.2-23.2	2.68(2)	2.28- 3.08	7.76(2)	7.56- 7.96
122900 FINE-GRAINED GRANITES(APLITE)	21.2(11)	21.1	.0	14.2-33.1	2.56(6)	2.13- 2.98	8.02(6)	7.29- 8.79
122A00 MEDIUM-GRAINED GRANITE	18.3(1)	.0	.0	18.3-18.3	.00(0)	.00- .00	.00(0)	.00- .00
122B00 COARSE-GRAINED GRANITE	18.2(4)	.0	.0	17.0-19.6	.00(0)	.00- .00	.00(0)	.00- .00
122C10 HORNBLENDE GRANITE	19.9(2)	.0	.0	16.5-23.2	2.69(2)	1.97- 3.40	7.61(2)	6.84- 8.37

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
123000 GRANODIORITES	19.0(17)	20.0	20.6	14.7-21.9	2.32(17)	1.87- 2.81	8.16(17)	6.99- 9.01
124000 TONALITES	15.1(1)	.0	.0	15.1-15.1	.00(0)	.00- .00	.00(0)	.00- .00
124200 HORNBLENDE TONALITE	15.1(1)	.0	.0	15.1-15.1	.00(0)	.00- .00	.00(0)	.00- .00
125000 GRANITOID PORPHYRIES	21.8(6)	19.4	.0	18.8-27.5	3.05(6)	2.57- 4.08	7.19(6)	6.74- 7.42
125100 QUARTZ FELSPAR PORPHYRIES	21.8(6)	19.4	.0	18.8-27.5	3.05(6)	2.57- 4.08	7.19(6)	6.74- 7.42
126000 LEUCO TONALITES	16.1(3)	15.9	.0	15.5-17.0	2.06(2)	2.02- 2.10	7.98(2)	7.84- 8.11
126100 LEUCO BIOTITE TONALITE	16.1(3)	15.9	.0	15.5-17.0	2.06(2)	2.02- 2.10	7.98(2)	7.84- 8.11

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
130000 A + P + Q ROCKS	16.0(28)	17.5	17.6	7.2-21.8	2.13(25)	1.49- 2.80	7.30(25)	3.91- 8.79
132000 QUARTZ SYENITE	20.0(3)	20.7	.0	17.5-21.8	2.32(3)	2.00- 2.60	8.64(3)	8.37- 8.79
133000 QUARTZ MONZONITES(ADAMELLITE)	19.8(8)	19.7	.0	17.4-21.5	2.46(8)	2.14- 2.80	8.06(8)	7.69- 8.70
134000 QUARTZ MONZODIORITE	18.5(1)	.0	.0	18.5-18.5	2.25(1)	2.25- 2.25	8.20(1)	8.20- 8.20
137000 QUARTZ GABBROS	12.5(10)	13.2	.0	10.4-14.0	1.94(10)	1.80- 2.08	6.45(10)	5.03- 7.30
139000 QUARTZ DOLERITE	17.9(3)	17.9	.0	17.8-18.0	.00(0)	.00- .00	.00(0)	.00- .00
13A000 QUARTZ NORITE	10.6(3)	12.2	.0	7.2-12.4	1.68(3)	1.49- 1.84	6.47(3)	3.91- 8.20

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
140000 A + P +- Q ROCKS	17.8(310)	16.9	15.8	7.4-44.6	2.12(210)	1.01- 3.38	8.92(210)	3.59-15.97
141000 ALKALI-FELSPAR SYENITES	16.5(8)	15.6	.0	13.2-23.7	1.84(8)	1.51- 2.51	8.98(8)	8.27- 9.45
142000 SYENITE	23.5(3)	21.6	.0	20.8-28.2	2.50(3)	1.94- 2.93	9.54(3)	7.89-11.10
143000 MONZONITES	22.0(12)	21.6	.0	20.5-27.7	2.76(12)	2.43- 3.36	7.98(12)	7.57- 8.98
143100 BOSTONITE	27.7(1)	.0	.0	27.7-27.7	3.36(1)	3.36- 3.36	8.23(1)	8.23- 8.23
144000 MONZODIORITE	22.6(1)	.0	.0	22.6-22.6	2.87(1)	2.87- 2.87	7.87(1)	7.87- 7.87
146000 DIORITES.	21.8(10)	21.3	.0	21.0-25.0	2.80(7)	2.53- 2.84	7.86(7)	7.48- 8.79
146100 PYROXENE DIORITES	21.4(6)	21.3	.0	21.0-22.2	2.73(6)	2.53- 2.84	7.87(6)	7.48- 8.79
146200 FERRODIORITE	23.0(2)	.0	.0	21.0-25.0	.00(0)	.00- .00	.00(0)	.00- .00

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
197000 GABBROID ROCKS	17.0(230)	16.2	15.7	7.4-31.5	2.18(153)	1.35- 3.38	8.19(153)	3.59-12.33
19710D GABBROID ROCKS - PLAG+PYX+OL	17.0(83)	16.6	15.8	9.2-25.3	2.17(76)	1.42- 3.38	8.19(76)	3.59-11.57
19718D TROCTOLITE	17.5(2)	.0	.0	13.5-21.4	1.75(1)	1.75- 1.75	7.74(1)	7.74- 7.74
1971E0 OLIVINE GABBROS	17.0(81)	16.6	15.8	9.2-25.3	2.18(75)	1.42- 3.38	8.20(75)	3.59-11.57
1971E1 OLIVINE FERROGABBROS	19.5(17)	19.8	20.5	16.5-25.3	2.27(17)	1.63- 2.71	8.69(17)	7.08-11.50
1971E2 GABBRO-PICRITES	14.8(17)	14.7	15.0	9.9-24.9	2.74(17)	2.45- 3.38	5.37(17)	3.59- 7.36
1971E4 OLIVINE OPX FERROGABBRO	21.5(3)	21.5	.0	21.3-21.7	2.73(3)	2.54- 2.90	7.92(3)	7.43- 8.41
197200 GABBROID ROCKS : PLAG + PYX	17.2(139)	16.1	15.6	7.4-31.5	2.21(75)	1.37- 3.38	8.16(75)	6.93-12.33
197220 NORITES	14.4(14)	12.6	.0	7.4-31.5	1.37(1)	1.37- 1.37	9.00(1)	9.00- 9.00
197270 LEUCO GABBRO	30.9(1)	.0	.0	30.9-30.9	2.54(1)	2.54- 2.54	12.16(1)	12.16-12.16
197280 GABBROS	19.5(49)	20.6	20.8	9.3-28.6	2.62(18)	1.37- 3.38	8.52(18)	6.93-12.33
197281 FERROGABBROS	22.6(6)	22.9	.0	16.8-26.9	2.47(6)	1.37- 3.38	9.52(6)	7.95-12.33
197282 ORTHOPYROXENE FERROGABBROS	20.9(9)	20.8	.0	19.7-22.1	2.73(9)	2.58- 2.81	7.65(9)	7.32- 7.97
197283 BIOTITE OPX GABBRO	14.5(4)	14.4	.0	13.6-15.8	.00(0)	.00- .00	.00(0)	.00- .00
1972A0 DOLERITES	16.1(74)	15.9	15.6	11.2-22.7	2.09(54)	1.55- 3.20	7.94(54)	7.00- 9.80
197280 EUCRITE	15.0(1)	.0	.0	15.0-15.0	1.79(1)	1.79- 1.79	8.37(1)	8.37- 8.37

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
148000 ANORTHOSITES	19.4(46)	18.0	18.0	14.0-44.6	1.28(26)	1.01- 2.35	13.82(26)	11.90-15.80
148100 TROCTOLITIC ANORTHOSITES	16.7(17)	16.8	18.0	14.0-18.7	1.24(17)	1.09- 1.44	13.55(17)	11.90-15.61
148200 NORITIC ANORTHOSITE	19.2(2)	.0	.0	19.2-19.2	1.27(2)	1.27- 1.27	15.12(2)	15.09-15.19

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
150000 A + P +- F ROCKS	23.8(69)	19.6	19.3	12.9-45.8	2.56(69)	1.45- 5.77	9.54(69)	5.83-12.41
151000 FOID-BEARING ALK-FELS SYENITE	16.1(5)	16.0	.0	14.5-18.4	1.66(5)	1.46- 2.02	9.73(5)	9.10- 9.95
151100 PULASKITE	16.1(5)	16.0	.0	14.5-18.4	1.66(5)	1.46- 2.02	9.73(5)	9.10- 9.95
152000 FOID-BEARING SYENITES	32.0(29)	31.9	23.5	20.2-45.8	3.32(29)	1.87- 5.77	10.08(29)	7.67-11.99
152100 NEPH-CANC-PYX SYENITE	42.4(5)	42.0	.0	40.0-44.6	4.69(5)	4.40- 5.10	9.04(5)	8.60- 9.67
152200 AMPHIBOLE-NEPHELINE SYENITE	32.7(3)	32.7	.0	31.9-33.3	4.10(3)	3.97- 4.35	7.93(3)	7.67- 8.24
152300 NEPH-AMPHIBOLE-PYX SYENITE	44.8(3)	45.0	.0	43.7-45.8	5.57(3)	5.44- 5.77	8.05(3)	7.94- 8.26
152400 NEPHELINE SYENITES	23.2(5)	20.3	.0	20.2-33.7	2.25(5)	1.87- 3.37	10.37(5)	9.83-10.89
152500 NEPH CANC SODALITE SYENITE	27.2(5)	24.6	.0	23.6-38.1	2.45(5)	1.98- 3.89	11.34(5)	9.77-11.93
152600 CANCRINITE SODALITE SYENITES	28.8(8)	26.9	.0	22.6-43.3	2.55(8)	1.88- 3.88	11.32(8)	10.57-11.99
157000 FOID-BEARING GABBROS	18.1(35)	18.7	19.3	12.9-22.5	2.06(35)	1.45- 2.72	9.06(35)	5.83-12.41
157100 NEPHELINE OLIVINE GABBROS	17.4(8)	18.4	.0	14.2-19.9	1.93(8)	1.52- 2.45	9.25(8)	5.83-11.43
157200 NEPHELINE OLIVINE DOLERITE	19.0(1)	.0	.0	19.0-19.0	2.10(1)	2.10- 2.10	9.06(1)	9.06- 9.06
157300 NEPH-BEARING OLIVINE GABBROS	18.2(25)	18.5	18.8	12.9-22.5	2.08(25)	1.45- 2.72	9.03(25)	6.16-12.41
157400 NEPH-BEARING OLIVINE DOLERITE	19.0(1)	.0	.0	19.0-19.0	2.32(1)	2.32- 2.32	8.21(1)	8.21- 8.21

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
160000 A + P + F ROCKS	18.6(28)	17.6	17.4	14.5-27.0	1.86(28)	1.29- 3.01	10.20(28)	5.72-11.67
161000 FOID SYENITES (FOYAITES)	19.2(13)	19.2	.0	14.5-26.7	1.78(13)	1.29- 2.89	10.96(13)	9.24-11.67
161100 TINGUAITES	22.2(5)	21.7	.0	18.8-26.7	2.15(5)	1.68- 2.89	10.54(5)	9.24-11.53
161110 SODALITE TINGUAITE	22.2(5)	21.7	.0	18.8-26.7	2.15(5)	1.68- 2.89	10.54(5)	9.24-11.53
163000 FOID MONZODIORITES(ESSEXITES)	16.7(11)	17.1	.0	15.2-18.4	1.70(11)	1.43- 2.03	9.91(11)	9.04-10.69
163100 ANDESINE MONZODIORITES	17.6(6)	17.6	.0	17.1-18.4	1.83(6)	1.73- 2.03	9.64(6)	9.04-10.13
163200 OLIGOCLASE MONZODIORITE	15.7(5)	15.3	.0	15.2-16.5	1.53(5)	1.43- 1.66	10.23(5)	9.73-10.69
164000 FOID MONZOGABBRO (ESSEXITE)	24.7(2)	.0	.0	22.3-27.0	2.60(2)	2.18- 3.01	9.60(2)	8.98-10.22
166000 FOID GABBRO (THERALITE)	18.3(2)	.0	.0	15.7-20.8	2.52(2)	2.27- 2.76	7.45(2)	5.72- 9.18

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
170000 F -- A -- P ROCKS	18.0(8)	14.3	.0	11.5-31.5	2.15(8)	1.50- 3.69	8.37(8)	6.89-10.29
172000 IJOLITES	31.0(1)	.0	.0	31.0-31.0	3.69(1)	3.69- 3.69	8.40(1)	8.40- 8.40
173000 MELTEIGITES	16.6(6)	14.2	.0	11.5-31.5	1.98(6)	1.50- 3.60	8.45(6)	6.89-10.29
177000 NEPHELINITE	13.1(1)	.0	.0	13.1-13.1	1.67(1)	1.67- 1.67	7.85(1)	7.85- 7.85

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
180000 ULTRAMAFIC ROCKS M=90-100%	6.3(257)	5.3	3.6	<.3-34.8	3.27(231)	.46-41.31	2.79(231)	.01-13.81
181000 ULTRAMAFIC ROCKS : OL + PYX	3.6(35)	3.7	5.5	<.3- 8.3	1.61(18)	.60- 2.92	2.39(18)	.01- 3.83
181100 PERIDOTITE	3.3(6)	3.8	.0	.4- 5.9	1.42(6)	.60- 2.03	2.07(6)	.66- 3.52
181110 SERPENTINISED PERIDOTITE	4.8(2)	.0	.0	3.8- 5.9	1.62(2)	1.55- 1.68	2.97(2)	2.42- 3.52
181200 PYROXENITES	3.3(14)	3.0	.0	1.3- 6.3	1.42(5)	1.20- 1.80	2.24(5)	1.71- 3.32
181300 DUNITE	2.2(3)	1.6	.0	.6- 4.6	.00(0)	.00- .00	.00(0)	.00- .00
181310 HORTONOLITE DUNITE	4.6(1)	.0	.0	4.6- 4.6	.00(0)	.00- .00	.00(0)	.00- .00
181600 HARZBURGITES	4.3(10)	5.4	.0	1.5- 6.2	1.73(5)	1.61- 1.85	3.30(5)	2.97- 3.83
181610 SERPENTINISED HARZBURGITE	1.8(1)	.0	.0	1.8- 1.8	.00(0)	.00- .00	.00(0)	.00- .00
181800 WEBSTERITES	8.3(1)	.0	.0	8.3- 8.3	2.92(1)	2.92- 2.92	2.83(1)	2.83- 2.83
181810 AMPHIBOLITISED WEBSTERITE	8.3(1)	.0	.0	8.3- 8.3	2.92(1)	2.92- 2.92	2.83(1)	2.83- 2.83
182000 ULTRAMAFIC ROCKS :OL+PYX+AMPH	8.3(2)	.0	.0	5.1-11.5	3.23(2)	2.23- 4.22	3.18(2)	1.20- 5.15
182300 AMPHIBOLE ROCK	8.3(2)	.0	.0	5.1-11.5	3.23(2)	2.23- 4.22	3.18(2)	1.20- 5.15
183000 ULTRAMAFIC ROCKS :OL+PYX+PLAG	8.1(8)	6.6	.0	4.7-15.4	3.77(2)	3.31- 4.22	3.63(2)	3.61- 3.65
183700 PLAG-BEARING HARZBURGITE	5.5(2)	.0	.0	4.9- 6.1	.00(0)	.00- .00	.00(0)	.00- .00
183800 PICRITE	10.7(4)	10.5	.0	7.0-15.4	3.77(2)	3.31- 4.22	3.63(2)	3.61- 3.65
183C00 PLAG-BEARING PYROXENITE	5.5(2)	.0	.0	4.7- 6.3	.00(0)	.00- .00	.00(0)	.00- .00

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
184000 ULTRAMAFIC ROCKS : NO OLIVINE	14.2(1)	.0	.0	14.2-14.2	2.00(1)	2.00- 2.00	7.13(1)	7.13- 7.13
184100 ECLOGITE	14.2(1)	.0	.0	14.2-14.2	2.00(1)	2.00- 2.00	7.13(1)	7.13- 7.13
185000 ULTRAMAFIC ROCKS + MELILITE	9.1(1)	.0	.0	9.1- 9.1	1.36(1)	1.36- 1.36	6.71(1)	6.71- 6.71
185100 MELILITITES	9.1(1)	.0	.0	9.1- 9.1	1.36(1)	1.36- 1.36	6.71(1)	6.71- 6.71
185110 NEPHELINE MELILITITE	9.1(1)	.0	.0	9.1- 9.1	1.36(1)	1.36- 1.36	6.71(1)	6.71- 6.71
187000 KIMBERLITES	6.7(103)	6.2	3.6	<.3-34.9	3.91(103)	1.43-14.65	1.84(103)	.07- 4.87
187100 MICA-RICH KIMBERLITES	7.1(15)	5.9	4.6	3.4-10.7	3.65(15)	2.44- 4.55	1.92(15)	1.01- 2.84
187200 NON-MICACEOUS KIMBERLITE	11.5(3)	11.9	.0	5.1-17.4	7.04(3)	4.18-11.70	1.66(3)	1.21- 2.27
187300 CARBONATITIC KIMBERLITE	31.2(3)	33.5	.0	26.4-33.6	9.43(3)	5.92-14.65	.39(3)	.18- .57
187400 NON-MIC CARB-RICH KIMBERLITE	6.5(4)	6.3	.0	5.1- 8.4	4.54(4)	3.73- 6.03	1.50(4)	.95- 2.20

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
188000 KIMBERLITIC XENOLITHS	6.2(119)	4.5	1.5	<.3-20.6	2.72(116)	.46-41.31	3.69(116)	.01-13.81
188100 KIMBERLITIC ECLOGITE XENOLITH	10.5(43)	11.1	11.4	3.1-18.9	1.39(40)	.46- 3.72	7.91(40)	4.43-13.81
188110 KYANITE ECLOGITE XENOLITHS	11.0(3)	11.5	.0	9.6-12.0	1.12(2)	1.11- 1.13	10.53(2)	10.18-10.88
188120 CORUNDUM ECLOGITE XENOLITHS	11.2(1)	.0	.0	11.2-11.2	.88(1)	.88- .88	12.79(1)	12.79-12.79
188200 PHLOGOPITE XENOLITHS	15.0(1)	.0	.0	15.0-15.0	.00(0)	.00- .00	.00(0)	.00- .00
188300 CLINOPYROXENE XENOLITHS	8.2(2)	.0	.0	6.1-10.2	8.21(2)	4.61-11.81	1.10(2)	.87- 1.33
188400 ILMENITE XENOLITHS	18.2(5)	18.2	.0	15.6-20.6	.00(0)	.00- .00	.00(0)	.00- .00
188500 CPX-ILMENITE XENOLITHS	12.2(2)	.0	.0	10.8-13.6	10.52(1)	10.52-10.52	1.03(1)	1.03- 1.03
188600 GARNET XENOLITHS	9.2(5)	9.1	.0	5.3-12.9	.82(5)	.56- 1.15	11.06(5)	9.42-12.17
188810 GARNET LHERZOLITE XENOLITHS	1.8(33)	1.3	1.4	.3- 5.8	1.99(33)	.55-11.00	1.01(33)	.33- 2.87
188900 PYROXENITE XENOLITHS	3.6(17)	3.3	3.0	1.8- 5.6	2.43(17)	1.20- 4.22	1.74(17)	.50- 3.32
188A00 PERIDOTITE XENOLITHS	2.6(5)	2.0	.0	1.7- 5.1	6.43(5)	3.35-10.95	.41(5)	.27- .51

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
190000 LAMPROPHYRES	14.7(14)	14.7	.0	11.8-17.8	1.88(14)	1.49- 2.45	8.05(14)	5.60-10.92
191000 CAMPTONITE	14.6(4)	14.6	.0	14.2-15.1	1.72(4)	1.49- 1.87	8.60(4)	7.61-10.17
192000 LEUCO CAMPTONITE	15.4(3)	15.0	.0	14.6-16.5	1.55(3)	1.52- 1.62	9.96(3)	9.03-10.92
193000 MELA CAMPTONITE	13.8(2)	.0	.0	13.6-13.9	1.68(2)	1.67- 1.69	8.20(2)	8.08- 8.31
194000 MONCHIQUITES	16.3(3)	15.9	.0	15.1-17.8	2.40(3)	2.36- 2.45	6.78(3)	6.32- 7.53
194100 NEPHELINE MONCHIQUITE	16.3(3)	15.9	.0	15.1-17.8	2.40(3)	2.36- 2.45	6.78(3)	6.32- 7.53
195000 ALNOITE	12.5(2)	.0	.0	11.8-13.1	2.14(2)	2.11- 2.17	5.83(2)	5.60- 6.05

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
200000 VOLCANIC ROCKS :MINERALOGICAL	20.9(517)	20.7	21.7	<.4-66.9	2.65(349)	1.11- 7.03	8.01(349)	.04-13.90
210000 GLASSY ROCKS, NO PHENOCRYSTS	29.5(6)	28.8	.0	23.7-39.1	4.26(5)	3.07- 5.72	7.25(5)	6.63- 8.34
211000 PITCHSTONE	24.0(1)	.0	.0	24.0-24.0	3.61(1)	3.61- 3.61	6.63(1)	6.63- 6.63
212000 OBSIDIAN	30.6(5)	32.0	.0	23.7-39.1	3.99(3)	3.07- 4.59	7.60(3)	7.07- 8.34
212100 RHYOLITIC OBSIDIAN	32.2(2)	.0	.0	32.0-32.4	4.46(2)	4.32- 4.59	7.24(2)	7.07- 7.40
212200 TRACHYTIC OBSIDIAN	23.7(1)	.0	.0	23.7-23.7	.00(0)	.00- .00	.00(0)	.00- .00
212300 COMENDITIC OBSIDIAN	32.3(2)	.0	.0	25.6-39.1	3.07(1)	3.07- 3.07	8.34(1)	8.34- 8.34
220000 Q + A + P ROCKS	23.2(21)	23.0	23.4	11.0-37.9	2.95(17)	1.80- 4.44	7.31(17)	6.12-10.16
221000 ALKALI RHYOLITES	28.8(1)	.0	.0	28.8-28.8	.00(0)	.00- .00	.00(0)	.00- .00
221100 COMENDITE	28.8(1)	.0	.0	28.8-28.8	.00(0)	.00- .00	.00(0)	.00- .00
222000 RHYOLITES	21.8(10)	18.6	.0	15.0-36.2	3.05(10)	2.23- 4.44	7.06(10)	6.38- 8.74
223000 RHYODACITE	26.8(3)	23.0	.0	22.4-35.0	.00(0)	.00- .00	.00(0)	.00- .00
224000 DACITES	23.7(3)	23.7	.0	21.9-25.5	3.20(3)	2.83- 3.44	7.42(3)	7.10- 7.73
224100 ICELANDITE (FERRODACITE)	23.7(3)	23.7	.0	21.9-25.5	3.20(3)	2.83- 3.44	7.42(3)	7.10- 7.73
226000 PORPHYRIES	16.1(1)	.0	.0	16.1-16.1	2.08(1)	2.08- 2.08	7.73(1)	7.73- 7.73
226200 FELSPAR PORPHYRY	16.1(1)	.0	.0	16.1-16.1	2.08(1)	2.08- 2.08	7.73(1)	7.73- 7.73
227000 FELSITE	37.9(1)	.0	.0	37.9-37.9	.00(0)	.00- .00	.00(0)	.00- .00

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
230000 A + P + Q ROCKS, Q = 20-60 %	25.5(3)	26.1	.0	20.7-29.7	3.26(3)	2.76- 3.86	7.83(3)	7.51- 8.28
232000 QUARTZ TRACHYTE	29.7(1)	.0	.0	29.7-29.7	3.86(1)	3.86- 3.86	7.70(1)	7.70- 7.70
234000 QUARTZ LATITE ANDESITE	26.1(1)	.0	.0	26.1-26.1	3.15(1)	3.15- 3.15	8.28(1)	8.28- 8.28
240000 A + P +- Q ROCKS, Q=0-5%	20.0(390)	20.2	21.8	7.2-43.2	2.50(248)	1.11- 4.82	8.08(248)	4.05-11.80
241000 ALKALI TRACHYTES	27.5(13)	25.1	.0	16.7-43.2	3.12(10)	2.10- 4.75	9.48(10)	8.89-10.79
241100 AEGIRINE AUGITE TRACHYTE	32.5(5)	30.7	.0	18.0-43.2	4.18(3)	3.39- 4.75	9.16(3)	9.06- 9.32
242000 TRACHYTES	27.7(24)	27.9	28.4	17.7-39.3	3.13(16)	2.28- 3.88	8.99(16)	7.55-10.40
242100 HORNBLENDE TRACHYTE	25.3(1)	.0	.0	25.3-25.3	.00(0)	.00- .00	.00(0)	.00- .00
243000 LATITE	24.7(4)	23.5	.0	18.5-33.4	2.16(2)	1.83- 2.58	9.64(2)	9.16-10.12
243100 OLIVINE LATITE	26.0(2)	.0	.0	18.5-33.4	1.83(1)	1.83- 1.83	10.12(1)	10.12-10.12

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
244000 LATITE ANDESITES	24.0(20)	24.0	22.0	16.3-32.0	2.66(13)	2.06- 3.37	9.25(13)	8.19-10.36
244100 MUGEARITE(OL LATITE ANDESITE)	24.5(3)	24.1	.0	23.9-25.4	.00(0)	.00- .00	.00(0)	.00- .00
244110 BIOTITE MUGEARITE	25.4(1)	.0	.0	25.4-25.4	.00(0)	.00- .00	.00(0)	.00- .00
244200 BENMOREITE	28.0(2)	.0	.0	27.6-28.3	3.37(2)	3.37- 3.37	8.29(2)	8.19- 8.39
244300 BIOTITE LATITE ANDESITE	16.8(1)	.0	.0	16.8-16.8	.00(0)	.00- .00	.00(0)	.00- .00
245000 LATITE BASALTS(TRACHYBASALTS)	22.6(48)	22.1	21.7	19.4-29.0	2.60(33)	2.01- 3.36	8.74(33)	7.40-10.55
246000 ANDESITE	21.9(4)	22.3	.0	19.5-23.7	3.08(1)	3.08- 3.08	7.71(1)	7.71- 7.71
246100 LABRADORITE ANDESITE	19.5(1)	.0	.0	19.5-19.5	.00(0)	.00- .00	.00(0)	.00- .00

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	GALLIUM PPM MEDIAN	GALLIUM PPM MODE	GALLIUM PPM RANGE	GA/AL X 10000 MEAN	GA/AL X 10000 RANGE	ALUMINIUM % MEAN	ALUMINIUM % RANGE
247000 BASALTIC ROCKS	18.1(276)	17.7	16.6	7.2-29.0	2.38(173)	1.11- 4.82	7.68(173)	4.05-11.80
247000 BASALTIC ROCKS, CONTINENTAL	17.5(90)	17.2	12.7	7.2-29.0	2.55(70)	1.44- 4.39	7.13(70)	4.05- 9.16
247000 BASALTIC ROCKS, OCEANIC	18.4(187)	17.9	17.0	8.4-26.7	2.26(103)	1.11- 4.82	8.05(103)	4.34-11.80
247100 BASALTIC ROCKS :PLAG+PYX+OL	16.6(30)	16.6	17.3	10.5-22.5	2.34(22)	1.41- 3.44	7.16(22)	4.34- 9.03
247110 OLIVINE BASALTS	16.6(26)	16.6	17.0	10.5-22.5	2.38(20)	1.41- 3.44	7.07(20)	4.34- 9.03
247111 PICRITIC BASALTS	14.2(7)	13.9	.0	10.5-18.6	2.31(6)	1.41- 3.09	6.11(6)	4.34- 8.29
247120 OLIVINE MELA BASALT	18.8(1)	.0	.0	18.8-18.8	.00(0)	.00- .00	.00(0)	.00- .00
247130 OLIVINE THOLEIITE BASALT	16.0(2)	.0	.0	14.6-17.5	1.98(2)	1.79- 2.17	8.11(2)	8.05- 8.17

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
247200 BASALTIC ROCKS : PLAG + PYX	18.3(245)	17.9	16.4	7.2-29.0	2.37(150)	1.11- 4.39	7.77(150)	4.05-11.80
247210 THOLEIITE BASALTS	15.8(88)	15.7	16.1	9.9-23.0	1.94(59)	1.11- 2.94	8.17(59)	4.96-11.80
247211 PLAG-PHYRIC THOLEIITE BASALT	12.9(1)	.0	.0	12.9-12.9	1.12(1)	1.12- 1.12	11.49(1)	11.49-11.49
247220 BASALTS	19.7(153)	20.2	20.6	7.2-29.0	2.64(90)	1.49- 4.39	7.51(90)	4.05- 9.80
247221 FERROBASALT	24.2(2)	.0	.0	23.2-25.2	3.14(2)	2.97- 3.30	7.74(2)	7.66- 7.81
247300 BASALTIC ROCKS PLAG+PYX+AMPH	24.6(1)	.0	.0	24.6-24.6	4.82(1)	4.82- 4.82	5.10(1)	5.10- 5.10
247310 HORNBLENDE BASALT (YAMASKITE)	24.6(1)	.0	.0	24.6-24.6	4.82(1)	4.82- 4.82	5.10(1)	5.10- 5.10
247210 CONTINENTAL THOLEIITES	13.8(22)	13.5	12.6	9.9-20.1	1.69(12)	1.44- 2.22	7.41(12)	4.96- 8.97
247210 OCEANIC THOLEIITES	16.5(66)	16.4	16.0	12.9-23.0	2.00(47)	1.11- 2.94	8.36(47)	6.80-11.80
247220 CONTINENTAL BASALTS	18.8(68)	18.9	20.6	7.2-29.0	2.72(58)	1.49- 4.39	7.07(58)	4.05- 9.16
247220 OCEANIC BASALTS	20.3(87)	20.7	22.3	8.4-26.7	2.55(34)	2.04- 3.30	8.12(34)	5.99- 9.75

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
250000 A + P +- F ROCKS	20.9(34)	20.4	20.5	10.9-35.2	2.72(24)	1.96- 4.18	8.28(24)	4.24-10.28
254000 FOID-BEARING LATITE ANDESITES	27.6(2)	.0	.0	26.7-28.4	3.03(2)	2.99- 3.06	9.12(2)	8.95- 9.28
254100 TAHITITE	27.6(2)	.0	.0	26.7-28.4	3.03(2)	2.99- 3.06	9.12(2)	8.95- 9.28
257000 FOID-BEARING BASALTIC ROCKS	20.5(32)	20.2	20.5	10.9-35.2	2.69(22)	1.96- 4.18	8.20(22)	4.24-10.28
257100 ALKALI OLIVINE BASALTS	20.9(26)	20.4	20.7	15.5-28.1	2.61(18)	1.96- 3.13	8.48(18)	6.74-10.28
257110 HAWAIITES	22.5(12)	22.0	.0	20.0-26.1	2.59(10)	1.96- 3.13	8.85(10)	7.70-10.28
257120 OLIVINE AUGITE BASALT	18.5(1)	.0	.0	18.5-18.5	2.72(1)	2.72- 2.72	6.79(1)	6.79- 6.79
257200 ALKALI OLIVINE MELABASALT	10.9(1)	.0	.0	10.9-10.9	.00(0)	.00- .00	.00(0)	.00- .00
257300 ALKALI BASALT	22.9(4)	21.0	.0	14.4-35.2	3.24(3)	2.52- 4.18	7.88(3)	7.46- 8.41
257310 AUGITE BASALT	14.4(1)	.0	.0	14.4-14.4	.00(0)	.00- .00	.00(0)	.00- .00
257400 ALKALI MELABASALT	11.5(1)	.0	.0	11.5-11.5	.00(0)	.00- .00	.00(0)	.00- .00

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
260000 A + P + F ROCKS	31.5(27)	29.1	26.6	19.2-66.9	3.16(20)	1.91- 7.03	10.30(20)	7.02-11.64
261000 PHONOLITES	32.4(25)	29.1	26.6	20.8-66.9	3.23(18)	1.91- 7.03	10.57(18)	9.44-11.64
264000 TEPHRITES	29.3(2)	.0	.0	21.1-37.6	2.40(1)	2.40- 2.40	8.79(1)	8.79- 8.79
264100 OLIVINE TEPHRITE (BASANITE)	29.3(2)	.0	.0	21.1-37.6	2.40(1)	2.40- 2.40	8.79(1)	8.79- 8.79
270000 F +- A +- P ROCKS	27.5(9)	26.7	.0	15.5-34.9	3.39(8)	2.40- 4.63	8.32(8)	6.48- 9.82
271000 PHONOLITIC FOIDITES	27.1(4)	25.5	.0	23.3-33.9	2.93(4)	2.55- 3.45	9.22(4)	8.72- 9.82
271100 PHONOLITIC NEPHELINITES	27.1(4)	25.5	.0	23.3-33.9	2.93(4)	2.55- 3.45	9.22(4)	8.72- 9.82
273000 NEPHELINITES	27.8(5)	31.3	.0	15.5-34.9	4.32(3)	4.11- 4.63	7.73(3)	7.42- 8.23
273200 MELILITE NEPHELINITE	23.3(1)	.0	.0	23.3-23.3	.00(0)	.00- .00	.00(0)	.00- .00

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
280000 ULTRAMAFIC ROCKS : M=90-100%	12.8(19)	15.0	15.0	1.0-20.1	2.67(12)	1.46- 3.94	3.92(12)	.51- 7.41
281000 ULTRAMAFIC ROCKS : OL + PYX	17.0(4)	16.7	.0	15.0-19.7	3.47(2)	3.46- 3.48	4.36(2)	4.30- 4.42
281100 LIMBURGITES	17.0(4)	16.7	.0	15.0-19.7	3.47(2)	3.46- 3.48	4.36(2)	4.30- 4.42
283000 ULTRAMAFIC ROCKS :OL+PYX+PLAG	14.7(11)	15.1	.0	6.3-20.1	2.86(6)	2.08- 3.94	5.30(6)	3.03- 7.41
283100 OCEANITE	12.7(2)	.0	.0	11.5-14.0	.00(0)	.00- .00	.00(0)	.00- .00
283200 ANKARAMITES	16.8(7)	16.4	.0	14.5-20.1	2.73(3)	2.34- 2.97	6.91(3)	6.38- 7.41
283300 PICRITES	9.5(2)	.0	.0	6.3-12.7	3.01(2)	2.08- 3.94	3.13(2)	3.03- 3.23
286000 SERPENTINITE	1.7(3)	1.9	.0	1.0- 2.2	1.91(3)	1.46- 2.39	.90(3)	.51- 1.29

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
290000 FRAGMENTAL ROCKS	32.0(5)	28.5	.0	15.0-50.9	3.22(5)	1.95- 5.52	10.10(5)	7.71-13.90
291000 FELSIC TUFF	28.5(1)	.0	.0	28.5-28.5	2.05(1)	2.05- 2.05	13.90(1)	13.90-13.90
292000 ERUPTIVE BRECCIA	38.8(3)	43.4	.0	22.0-50.9	4.03(3)	2.31- 5.52	9.63(3)	9.22-10.18
2A0000 NON-SILICATE ROCKS	<.4(2)	.0	.0	<.4- <.4	<9.04(2)	<8.40-<9.68	.05(2)	.04- .05
2A1000 CARBONATITE	<.4(2)	.0	.0	<.4- <.4	<9.04(2)	<8.40-<9.68	.05(2)	.04- .05
2A1100 LENGAITES	<.4(2)	.0	.0	<.4- .4	<9.04(2)	<8.40-<9.68	.05(2)	.04- .05

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
300000 VOLCANIC ROCKS (CHEMICAL)	8.2(108)	7.1	4.3	1.4-23.8	2.26(95)	1.55- 3.80	3.73(95)	1.04-10.28
310000 SUBALKALINE ROCKS	8.0(107)	6.9	4.3	1.4-23.8	2.25(94)	1.55- 3.80	3.66(94)	1.04- 9.83
311000 SUBALKALINE ROCKS -THOLEIITIC	7.0(96)	6.4	4.3	1.4-15.2	2.27(87)	1.55- 3.80	3.39(87)	1.04- 6.27
311600 PERIDOTITIC KOMATIITES	3.9(42)	4.0	4.2	1.4- 6.4	2.48(37)	1.92- 3.80	1.66(37)	1.04- 2.43
311700 BASALTIC KOMATIITES	9.4(54)	9.6	10.5	4.6-15.2	2.11(50)	1.55- 3.09	4.58(50)	2.00- 6.27
311710 BASALTIC KOMATIITES(BARBERTON	11.1(28)	11.1	11.3	8.4-15.2	2.03(28)	1.55- 2.71	5.49(28)	4.09- 6.27
311720 BASALTIC KOMATIITES(BADPLAAS)	8.0(14)	8.0	.0	4.8-12.7	2.28(13)	1.88- 3.09	3.64(13)	2.36- 4.64
311730 BASALTIC KOMATIITES (GELUK)	6.6(9)	6.8	.0	4.6- 8.3	2.13(9)	1.57- 2.74	3.14(9)	2.00- 4.12
312000 SUBALKALINE ROCKS - CALC-ALK	16.9(11)	15.1	.0	13.6-23.7	2.17(7)	1.96- 2.42	7.64(7)	6.32- 9.83
312100 HIGH-ALUMINA BASALT	17.3(4)	17.2	.0	13.6-21.0	.00(0)	.00- .00	.00(0)	.00- .00
312300 ANDESITES	15.0(1)	.0	.0	15.0-15.0	2.38(1)	2.38- 2.38	6.32(1)	6.32- 6.32
312320 HIGH-K ANDESITE	15.0(1)	.0	.0	15.0-15.0	2.38(1)	2.38- 2.38	6.32(1)	6.32- 6.32
312400 DACITES	16.9(6)	14.7	.0	14.0-23.7	2.13(6)	1.96- 2.42	7.86(6)	6.65- 9.83

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
320000 ALKALINE ROCKS (CHEMICAL)	23.6(1)	.0	.0	23.6-23.6	2.30(1)	2.30- 2.30	10.28(1)	10.28-10.28
321000 ALKALINE ROCKS - SODIC SERIES	23.6(1)	.0	.0	23.6-23.6	2.30(1)	2.30- 2.30	10.28(1)	10.28-10.28
321400 ALKALI BASALT - SODIC SERIES	23.6(1)	.0	.0	23.6-23.6	2.30(1)	2.30- 2.30	10.28(1)	10.28-10.28

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
400000 SEDIMENTARY ROCKS (CLASTIC)	24.1(46)	24.1	12.4	9.3-38.4	2.42(41)	1.74- 3.69	10.33(41)	4.75-15.15
480000 MEDIUM SAND	9.3(1)	.0	.0	9.3- 9.3	1.96(1)	1.96- 1.96	4.75(1)	4.75- 4.75
4B0000 MEDIUM SAND (CLAY FRACTION)	33.4(1)	.0	.0	33.4-33.4	2.40(1)	2.40- 2.40	13.93(1)	13.93-13.93
4KC000 FINE SILT	22.6(3)	21.8	.0	19.2-26.7	2.21(3)	1.88- 2.39	10.49(3)	8.17-14.21
4KH000 FINE CLAYEY SILT	24.2(2)	.0	.0	21.8-26.7	2.14(2)	1.88- 2.39	11.66(2)	9.10-14.21
4KC000 FINE SILT (CLAY FRACTION)	30.5(3)	30.5	.0	26.3-34.6	2.06(3)	1.74- 2.43	14.83(3)	14.27-15.12
4KH000 FINE CLAYEY SILT (CLAY FRAC)	30.5(2)	.0	.0	26.3-34.6	2.09(2)	1.74- 2.43	14.70(2)	14.27-15.12
4T0000 SHALES	20.0(25)	22.2	22.6	11.5-32.5	2.39(20)	1.87- 2.78	8.61(20)	5.56-12.32
4T3000 SILICEOUS SHALES	12.5(8)	12.6	.0	11.5-13.5	2.07(5)	1.87- 2.22	5.98(5)	5.56- 6.90
4T6000 FELSPATHIC SHALES	24.2(15)	23.2	22.7	21.3-32.5	2.53(13)	2.39- 2.78	9.67(13)	8.23-12.32
4T0000 SHALES - CLAY FRACTIONS	32.8(11)	33.0	.0	27.8-38.4	2.68(11)	1.88- 3.69	12.54(11)	9.56-15.15
4T3000 SILICEOUS SHALES (CLAY FRAC)	35.1(2)	.0	.0	34.9-35.3	3.57(2)	3.44- 3.69	9.86(2)	9.56-10.16
4T6000 FELSPATHIC SHALES (CLAY FRAC)	32.8(7)	33.0	.0	27.8-38.4	2.50(7)	1.88- 3.30	13.29(7)	11.65-15.15

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM MEAN	MEDIAN	MODE	RANGE	GA/AL X 10000 MEAN	RANGE	ALUMINIUM % MEAN	RANGE
7D0000 MINERALS	27.4(67)	.0	.0	<.3-99.9	4.45(32)	.56-91.31	10.85(32)	.50-52.92
7D0000 OXIDES, MULTIPLE OXIDES	49.3(12)	50.4	.0	18.1-99.9	2.47(2)	1.89- 3.06	31.15(2)	9.39-52.92
7DH000 SPINEL GROUP, CHROMIUM SPINEL	38.3(6)	38.5	.0	18.1-57.6	3.06(1)	3.06- 3.06	9.39(1)	9.39- 9.39
7DH100 CHROMITES	40.2(5)	40.9	.0	18.1-57.6	.00(0)	.00- .00	.00(0)	.00- .00
7DI200 MAGNETITES	52.2(5)	52.7	.0	48.9-54.0	.00(0)	.00- .00	.00(0)	.00- .00
7EI100 ILMENITES	18.2(5)	18.2	.0	15.6-20.6	.00(0)	.00- .00	.00(0)	.00- .00
7M0000 FELSPARS AND ZEOLITES	19.0(21)	18.8	20.4	4.9-31.6	1.54(9)	1.42- 1.67	9.61(9)	8.98-10.50
7M2000 PLAGIOCLASE FELSPARS	23.6(11)	22.5	.0	18.8-31.6	.00(0)	.00- .00	.00(0)	.00- .00
7M5000 ZEOLITES (UNKNOWN TYPE)	4.9(1)	.0	.0	4.9- 4.9	.00(0)	.00- .00	.00(0)	.00- .00
7MA100 PERTHITIC FELSPARS	14.9(9)	15.0	.0	13.0-17.5	1.54(9)	1.42- 1.67	9.61(9)	8.98-10.50
7N0000 PYROXENES	6.2(11)	5.2	.0	.9-14.1	6.04(3)	1.70-11.81	.91(3)	.53- 1.33
7N1300 HYPERSTHENES	13.7(2)	.0	.0	13.4-14.1	.00(0)	.00- .00	.00(0)	.00- .00
7P2100 BIOTITES	60.2(9)	58.3	.0	56.9-65.9	5.98(9)	5.49- 6.65	10.08(9)	9.79-10.62
7Q4000 GARNETS (UNKNOWN TYPE)	9.2(5)	9.1	.0	5.3-12.9	.82(5)	.56- 1.15	11.06(5)	9.42-12.17

TABLE 38. (CONTD)

ROCK TYPE	GALLIUM PPM				GA/AL X 10000		ALUMINIUM %	
	MEAN	MEDIAN	MODE	RANGE	MEAN	RANGE	MEAN	RANGE
900000 METAMORPHIC ROCKS	20.6(39)	21.7	22.1	11.7-32.2	2.59(36)	1.80- 4.16	7.93(36)	5.78- 9.50

TABLE 39A

A COMPARISON BETWEEN DATA PRESENTED IN THIS WORK AND THAT FROM THE LITERATURE FOR Ga AND Ga/Al IN SOME MAJOR ROCK TYPES

Type	No. of samples	Ga ppm		Ga/Al x 10^4	
		Range	Mean	Range	Mean
Alkali syenite	15	---	24	---	3.0
This work	8	13-24	17	1.5-2.5	1.8
Nepheline syenite	88	20-50	44	2.2-4.7	4.3
This work	29	20-46	32	1.9-5.6	3.3
Foyaite	9	24-76	50	7.7-7.9	7.8
This work	13	15-27	19	1.3-2.9	1.8
Phonolite	5	19-22	21	1.9-2.3	2.2
This work	25	21-67	32	1.9-7.0	3.2
Comendite	9	25-38	32	4.0-5.9	4.9
This work	3	26-39	31	---	3.1
Rhyolite	5	16-22	19	2.4-2.7	2.6
This work	10	15-36	22	2.2-4.4	3.1
Granodiorite	51	11-39	17	1.3-5.7	2.2
This work	17	15-22	19	1.9-2.8	2.3
Granites	565	11-60	20	1.5-8.3	2.8
This work	64	9-39	20	1.5-5.8	2.6
Monzonite	10	---	23	---	3.0
This work	12	21-28	22	2.4-3.4	2.8
Tonalite	2	20-21	21	2.1-2.4	2.3
This work	4	15-17	16	2.0-2.1	2.1
Trachyte	7	17-25	20	---	
This work	24	18-39	28	2.3-3.9	3.1
Andesite	18	14-25	16	1.8-2.9	2.0
This work	5	15-24	21	2.4-3.1	2.8
Syenite	107	13-40	19	1.3-5.0	2.2
This work	3	21-28	24	1.9-2.9	2.5
Diorite	93	6-30	17	0.8-4.7	1.9
This work	10	21-25	22	2.5-2.8	2.8
Basaltic rocks	271	12-30	18	1.4-4.4	2.2
This work	276	7-29	18	1.1-4.8	2.4
Basalt	97	12-30	19	1.4-4.4	3.1
This work	153	7-29	20	1.5-4.4	2.6

contd.

TABLE 39B

Type	No. of samples	Ga ppm Range	Ga ppm Mean	Ga/Al x 10^4 Range	Ga/Al x 10^4 Mean
Tholeiite basalt	41	6-31	14	0.9-5.1	1.8
This work	88	10-23	16	1.1-2.9	1.9
Dolerite	20	16-30	22	---	---
This work	74	11-23	16	1.6-3.2	2.1
Gabbroid rocks	155	5-37	16	1.0-6.1	2.1
This work	230	7-32	17	1.4-3.4	2.2
Olivine & quartz gabbros	3	20-30	25	1.9-3.0	2.6
This work	91	9-25	17	1.4-3.4	2.2
Gabbro-picrite	2	5-10	8	---	2.2
This work	17	10-25	15	2.5-3.4	2.7
Norite	12	10-30	19	1.0-3.7	2.3
This work	14	7-32	14	---	1.4
Gabbros & ferrograbbros	41	10-37	20	1.2-6.1	2.4
This work	49	9-29	20	1.4-3.4	2.6
Anorthosite	4	19-21	20	1.2-1.5	1.3
This work	46	14-45	19	1.1-2.4	1.3
Serpentinite	17	1-8	2	3.0-4.1	3.6
This work	3	1-2	2	1.5-2.4	1.9
Pyroxenite	27	3-30	7	1.0-9.7	4.0
This work	14	1-6	3	1.2-1.8	1.4
Kimberlite	24	$<$3-30	$<$9	1.0-4.1	?
This work	103	$<$1-35	7	1.4-14.7	3.9
Kimberlitic xenoliths	--	---	--	---	---
This work	119	$<$1-21	6	0.5-41.3	2.7
Harzburgite	2	1-4	3	---	1.5
This work	10	2-6	4	1.6-1.9	1.7
Peridotite	27	1-11	4	0.6-3.8	1.2
This work	7	1-6	3	0.6-2.0	1.4
Dunite	15	0.5-1	1	0.2-1.1	0.8
This work	4	0.4-5	2	---	---

All literature data taken from Burton and Culkin (1972).

TABLE 40

COMPARISON OF PEARSON'S CORRELATION COEFFICIENTS (r) BETWEEN Ga-Al AND Ga-($Al+Fe^{3}$) FOR A NUMBER OF ROCK SUITES

Rock suite	Ga-Al r	Ga-($Al+Fe^{3}$) r	Number of data points
Doros igneous complex	0.91	0.95	9
Erongo igneous complex	-0.24	-0.71	6
Losberg igneous complex	0.94	0.95	18
Anorthosites (Kunene)	0.79	0.75	24
Mica-rich kimberlites	0.92	0.34	15
Matsoku xenoliths	0.97	0.95	9
Okonjeje igneous complex			
Tholeiitic series			
Gabbro-picrites	0.93	0.84	16
Olivine gabbros	0.63	0.75	30
Olivine ferrogabbros	0.20	-0.08	15
Alkali syenites	0.51	0.80	6
Alkali series			
Alkali olivine gabbros (granulitised)	0.92	0.78	6
Alkali olivine gabbros	0.55	0.91	18
Nepheline olivine gabbros	0.87	0.94	8
Melteigite + camptonite	0.88	0.66	14
Bouvetoya Island	-0.63	-0.91	13
Gough Island	1.00	0.98	7

r = Pearson's product moment correlation coefficient. This table should be read in conjunction with Figs 75-83.

TABLE 41A.

GALLIUM IN ABYSSAL BASALTS FROM THE ATLANTIC OCEAN.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MID-ATLANTIC RIDGE 45 DEGREES N								
DBA 20.0	14.4	1.81	7.92	.5	.18	1.3		THOLEIITE
DBA 20.1	14.4	1.69	8.47	.5	.18	1.3		THOLEIITE
DBA 20.2	14.1	1.71	8.23	.5	.18	1.3		THOLEIITE
DBA 14) GLASS	15.1	1.86	8.10	.5	.19	1.3		THOLEIITE
DBA 15) CHILL	15.9	1.99	7.99	.4	.15	.9		THOLEIITE
DBA 16) CENTER	17.0	2.12	7.99	.6	.21	1.3		THOLEIITE
DBA 11	15.9	1.93	8.20	.5	.20	1.2		THOLEIITE
DBA 12	17.0	2.07	8.20	.5	.20	1.2		THOLEIITE
DBA 13	16.5	1.82	9.05	.6	.21	1.3		THOLEIITE
DBA 17	35.2	4.18	8.41	.8	.30	.8		ALKALI BASALT
MID-ATLANTIC RIDGE, RIFT VALLEY 36 DEGREES N								
DR 8	10.6	1.41	7.49	.3	.10	.9		PICRITIC BASALT
DR 3-1	12.9	1.12	11.49	.4	.13	1.0		PLAGIOCLASE-PHYRIC THOLEIITE BASALT
DR 4	14.7	1.79	8.17	.4	.14	1.0		OLIVINE THOLEIITE BASALT

AL DATA FROM ERLANK(1975), MUIR ET AL.(1964) AND AUMENTO(1968)

TABLE 418.

GALLIUM IN ABYSSAL BASALTS FROM THE ATLANTIC OCEAN.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MID-ATLANTIC RIDGE 30 DEGREES N								
DBA 1	16.6	2.18	7.59	.5	.20	1.2		THOLEIITE
DBA 2	15.4		N.A.	.5	.19	1.2		THOLEIITE
DBA 3	15.7		N.A.	.5	.20	1.3		THOLEIITE
DBA 4	16.0		N.A.	.5	.20	1.2		THOLEIITE
DBA 5	15.9	2.03	7.81	.5	.19	1.2		THOLEIITE
DBA 6	15.7		N.A.	.5	.19	1.2		THOLEIITE
DBA 8	16.9	2.04	8.30	.6	.21	1.3		THOLEIITE
DBA 10	15.6	2.03	7.70	.5	.20	1.3		THOLEIITE
MID-ATLANTIC RIDGE 22 DEGREES N								
DBA 30	14.9	1.72	8.63	.6	.21	1.4		DOLERITE
DBA 33	16.3		N.A.	.6	.22	1.3		DOLERITE
DBA 37	15.7	1.78	8.77	.6	.21	1.4		DOLERITE
DBA 29	14.6		N.A.	.5	.18	1.3		DOLERITE

AL DATA FROM MUIR ET AL.(1966)

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 41C.

GALLIUM IN ABYSSAL BASALTS FROM THE ATLANTIC OCEAN.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MID-ATLANTIC RIDGE 22 DEGREES N (CONT.)									
DBA 34		17.3		N.A.	.6	.23	1.3		THOLEIITE
DBA 35		17.2		N.A.	.6	.23	1.3		THOLEIITE
DBA 36		16.3		N.A.	.6	.22	1.3		THOLEIITE
LAVA PILLOW									
DBA 31	PILLOW MARGIN	16.7		N.A.	.6	.22	1.3		THOLEIITE
DBA 32	PILLOW INTERIOR	16.5		N.A.	.6	.22	1.3		THOLEIITE
MID-ATLANTIC RIDGE 10 DEGREES N (AD 5-18)									
LAVA PILLOW									
DBA 21	MARGIN	14.9	1.53	9.71	.5	.13	.9		THOLEIITE
DBA 22	INTERMEDIATE	14.3	1.54	9.26	.5	.13	.9		THOLEIITE
DBA 23	INTERIOR	15.2	1.53	9.92	.5	.13	.8		THOLEIITE

AL DATA FROM HART ET AL.(1974)

*** N.A. = AL203 NOT KNOWN ***

TABLE 41D.

GALLIUM IN ABYSSAL BASALTS FROM THE ATLANTIC OCEAN.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MID-ATLANTIC RIDGE 6 DEGREES S (AD 3-3)									
LAVA PILLOW									
DBA 24	ALTERED	15.1	1.90	7.95	.5	.16	1.0		THOLEIITE
DBA 25	GLASSY	14.9	1.86	8.02	.5	.16	1.0		THOLEIITE
DBA 26	FRESH INTERIOR	15.5	1.92	8.06	.5	.16	1.0		THOLEIITE

AL DATA FROM HART ET AL.(1974)

TABLE 41E.

GALLIUM IN ABYSSAL BASALTS FROM THE ATLANTIC OCEAN.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MID-ATLANTIC RIDGE 8 DEGREES S									
LAVA PILLOW									
DBA 39	MARGIN	19.2		N.A.	.6	.22	1.1		BASALT WITH "ALKALINE AFFINITIES"
DBA 38	INTERIOR	18.5		N.A.	.6	.23	1.2		BASALT WITH "ALKALINE AFFINITIES"
MID-ATLANTIC RIDGE 21 DEGREES S (AD 2-1)									
LAVA PILLOW									
DBA 27	ALTERED	17.3	2.20	7.86	.6	.17	1.0		THOLEIITE
DBA 28	FRESH INTERIOR	17.6	2.20	8.00	.6	.14	.8		THOLEIITE

AL DATA FROM HART ET AL.(1974)

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 42A.

GALLIUM IN ABYSSAL BASALTS FROM THE PACIFIC OCEAN.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
EAST PACIFIC RISE								
DBP 5	13.1	1.11	11.80	.5	.18	1.4		THOLEIITE
DBP 8	15.0	1.74	8.57	.6	.20	1.3		THOLEIITE
DBP 6	15.5	1.97	7.87	.5	.16	1.0		THOLEIITE
DBP 7	22.6		N.A.	.8	.28	1.3		ANDESITE
JUAN DE FUCA RIDGE 45 DEGREES N								
DBP 1	17.0		N.A.	.6	.21	1.3		THOLEIITE
DBP 2	16.9		N.A.	.6	.21	1.3		THOLEIITE
DBP 3	17.5		N.A.	.6	.23	1.3		THOLEIITE
DBP 4	17.3		N.A.	.6	.23	1.3		THOLEIITE

AL DATA FROM ENGEL AND ENGEL (1964)

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 42B.

GALLIUM IN ABYSSAL BASALTS FROM THE PACIFIC OCEAN.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BLANCO FRACTURE ZONE									
LAVA PILLOW									
DBP 9	CORE	17.1	2.13	8.01	.6	.14	.8		THOLEIITE
DBP 10	]	17.1	2.15	7.96	.5	.14	.8		THOLEIITE
DBP 11	]	17.0	2.14	7.96	.6	.14	.8		THOLEIITE
DBP 12	]	16.9	2.13	7.93	.6	.14	.9		THOLEIITE
DBP 13	MARGIN	16.8	2.10	7.98	.6	.14	.8		THOLEIITE
MARIANAS TRENCH									
DBP 15		14.7		N.A.	.5	.18	1.3		THOLEIITE
DBP 16		15.7		N.A.	.5	.18	1.2		THOLEIITE
DBP 17		14.7		N.A.	.5	.18	1.3		THOLEIITE
EUA ISLAND									
DBP 18		14.5		N.A.	.5	.18	1.3		THOLEIITE

AL DATA FROM ENGEL AND ENGEL(1964)

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 43.

****
* GALLIUM IN ABYSSAL BASALTS FROM THE INDIAN OCEAN. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CARLSBERG RIDGE 5 DEGREES N								
DBI 1	14.8	1.71	8.63	.5	.19	1.3		THOLEIITE
DBI 2	15.1	1.76	8.56	.5	.19	1.3		THOLEIITE
DBI 3	14.9	1.69	8.81	.5	.19	1.3		THOLEIITE
DBI 4	17.8	2.14	8.29	.6	.21	1.2		THOLEIITE
LEG 25, JOIDES PROGRAM								
DBI 6 SITE 240	13.8	1.64	8.40	.5	.18	1.3		THOLEIITE
DBI 10 249	15.0	1.80	8.34	.5	.15	1.0		THOLEIITE
DBI 11 249	15.5	1.85	8.37	.5	.18	1.2		THOLEIITE
DBI 5 239	16.5	2.05	8.04	.5	.19	1.2		THOLEIITE
DBI 7 245	16.6	2.17	7.63	.5	.20	1.2		THOLEIITE
DBI 8 248	23.1	2.38	9.67	.5	.20	.9		THOLEIITE
DBI 12 248	22.6	2.45	9.19	.5	.19	.8		THOLEIITE
DBI 9 248	21.6	2.54	8.49	.5	.21	1.0		THOLEIITE

AL DATA FROM CANN(1969) AND ERLANK AND REID(1974)

TABLE 44A

COMPARATIVE DATA FOR Ga AND Ga/Al IN ABYSSAL THOLEIITES FROM THE ATLANTIC, PACIFIC AND INDIAN OCEANS, THIS WORK

Location	Ga ppm	Ga/Al x 10000
Atlantic Ocean		
Mid-Atlantic Ridge 45°N	15.5(7)	1.9(7)
Mid-Atlantic Ridge 36°N	14.7(1)	1.8(1)
Mid-Atlantic Ridge 30°N	16.0(8)	2.1(4)
Mid-Atlantic Ridge 22°N Dolerite	15.4(4)	1.8(2)
Mid-Atlantic Ridge 22°N	16.9(4)	1.8(2)
Mid-Atlantic Ridge 10°N	14.8(1)	1.5(1)
Mid-Atlantic Ridge 6°S	15.2(1)	1.9(1)
Mid-Atlantic Ridge 21°S	17.5(1)	2.2(1)
Mean of 8 locations	15.8	1.9
s.d.	1.0	0.2
Pacific Ocean		
East Pacific Rise	14.5(3)	1.9(2)
Juan de Fuca Ridge 45°N	17.2(4)	-
Blanco Fracture Zone 45°N	17.0(1)	2.1(1)
Marianas Trench	15.0(3)	-
Eua Island	14.5(1)	-
Mean of 5 locations	15.6	2.0
s.d.	1.4	-
Indian Ocean		
Carlsberg Ridge 5½°N	15.7(4)	1.8(4)
Leg 25, Deep Sea Drilling Project	15.5(5)	1.9(5)
Leg 25, Deep Sea Drilling Project, Site 248	22.4(3)	2.5(3)
Mean of 2 locations excluding Site 248	15.6	1.9
Mean of all oceans	15.7(48)	1.9(30)

(n) = number of samples.

Range in Ga/Al ratio due to analytical error = $\pm$ 0.2 (3s).

Range in Ga due to analytical error = $\pm$ 0.6 ($3s_c$).

TABLE 44B

COMPARATIVE DATA FOR Ga AND Ga/Al RATIO IN DSDP AND DREDGED BASALTS FROM ALL OCEANS

Sample Localities	Ga ppm	Ga/Al x 10000	Ref.
DSDP Basalts			
Leg 2, N. Atlantic	17(4)	2.0(4)	1
Leg 3, S. Atlantic	16(15)	1.9(9)	1
Leg 11, W. margin N. Atlantic	15(14)	1.8(14)	2
Leg 18, N.E. Pacific margin	17(3)	2.1(3)	3
Leg 19, N. Pacific and Bering Sea	15(3)	1.9(3)	4
Leg 22, central Indian Ocean, Site 215	17(5)	2.0(4)	5
Leg 22, central Indian Ocean, Sites 214 & 216	20(13)	2.7(8)	5
Leg 24, W. & NW. Indian Ocean	14(13)	-	6
Leg 25, W. Indian Ocean	16(5)	1.9(5)	7
Leg 28, S.E. Indian Ocean	17(21)	2.0(21)	8
Leg 29, Tasman Sea	15(9)	1.8(9)	9
Dredged Basalts			
Atlantic Ocean	16(5)	1.7(5)	10
Mid-Atlantic Ridge	18(33)	2.2(33)	11
Mid-Atlantic Ridge	14(12)	1.7(12)	12
Pacific Ocean	18(5)	2.0(5)	10
Carlsberg Ridge, Indian Ocean	20(6)	2.3(6)	13
Mid-ocean Ridge, Indian Ocean	13(2)	1.5(2)	14
Amirante Ridge, Indian Ocean	15(3)	1.7(3)	15
Gulf of Aden, Indian Ocean	15(7)	1.7(5)	16
Oceanic tholeiites, all oceans	17	1.9	10
Oceanic alkali basalts, all oceans	22	2.3	10
Dredged basalts, mean	16	1.9	7
DSDP basalts, mean	16	1.9	This work

References: 1 - Frey et al. (1974); 2 - Bryan et al. (1977); 3 - MacLeod and Pratt (1973); 4 - Stewart et al. (1973); 5 - Thompson et al. (1974); 6 - Engel et al. (1974); 7 - this work; 8 - Ford (1975); 9 - Ovenshine et al. (1975); 10 - Engel et al. (1965); 11 - Melson & Thompson (1971); 12 - Thompson et al. (1972); 13 - Cann (1969); 14 - Engel & Fisher (1969); 15 - Fisher et al. (1968); 16 - Cann (1970).

TABLE 45A.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
AZORES GROUP OF ISLANDS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
SAO MIGUEL								
AZ-2	8.4		N.A.	.4	.12	1.4		BASALT
PICO								
AZ-88	16.1		N.A.	.6	.21	1.3		BASALT
AZ-P-3	14.8		N.A.	.6	.21	1.4		BASALT
TERCEIRA								
AZ-1	22.3		N.A.	.7	.24	1.1		BASALT
FAIAL								
AZ-3	18.9		N.A.	.6	.23	1.2		BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45B.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
AZORES GROUP OF ISLANDS.
CONT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
FLORES								
AC-16	19.5		N.A.	.6	.23	1.2		LABRADORITE ANDESITE
AC-11	18.4		N.A.	.6	.21	1.2		OLIVINE BASALT
AC-12	16.7		N.A.	.6	.21	1.2		OLIVINE BASALT
AC-10	16.5		N.A.	.6	.21	1.2		OLIVINE BASALT
AC-13	18.1		N.A.	.5	.19	1.1		AEGIRINE-AUGITE TRACHYTE
AC-17	17.7		N.A.	.7	.24	1.4		TRACHYTE
AC-15	22.4		N.A.	.6	.23	1.0		TRACHYTE
AC-14	21.6		N.A.	.6	.22	1.0		TRACHYTE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45C.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
ASCENSION ISLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ASC 4	20.3	2.53	8.01	.6	.23	1.1	32.6	HAWAIITE
ASC 1	20.1		N.A.	.7	.24	1.2		HAWAIITE
ASC 2	23.4		N.A.	.8	.30	1.3		HAWAIITE
ASC 5	22.6	2.59	8.70	.6	.23	1.0	45.6	HAWAIITE
ASC 3	24.3	2.66	9.15	.6	.19	.8	43.8	HAWAIITE
ASC 6	23.9	2.63	9.08	.8	.28	1.2	55.2	MUGEARITE
ASC 8	23.7	2.58	9.16	.7	.27	1.1	62.3	MUGEARITE-TRACHYTE
ASC 7	24.1	2.71	8.89	.8	.28	1.2	63.2	MUGEARITE
ASC 9	26.0	2.94	8.82	.7	.25	1.0	84.8	TRACHYTE
ASC 10	30.6	3.56	8.58	.6	.24	.8	87.5	TRACHYTE
ASC 11	28.8	3.90	7.39	.6	.23	.8	87.6	COMENDITE
ASC 12	39.1	5.72	6.83	.6	.24	.6	92.0	OBSIDIAN (COMENDITIC)

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45D.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
BOUVET ISLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
OLDER LAVAS								
WJ8B	21.2	2.01	10.55	.8	.27	1.3	33.9	TRACHYBASALT
WJ17B	21.4	2.37	9.04	.8	.29	1.4	35.2	TRACHYBASALT
WJ16B	22.1	2.63	8.39	.8	.30	1.3	39.5	TRACHYBASALT
WJ7B	21.6	2.77	7.77	.6	.23	1.1	34.9	TRACHYBASALT
WJ2B	23.1	2.83	8.14	.6	.23	1.0	36.6	TRACHYBASALT
WJ14B	22.5	2.86	7.85	.6	.23	1.0	37.9	TRACHYBASALT
WJ1B	26.4	3.21	8.23	.8	.29	1.1	53.2	TRACHYANDESITE
WJ18B	31.3	4.44	7.03	.6	.23	.7	88.5	RHYOLITE (SODA)
YOUNGER LAVAS								
WJ5B	28.2	3.40	8.28	.7	.27	1.0	63.0	TRACHYTE
WJ11B	27.8	3.59	7.72	.7	.27	1.0	67.5	TRACHYTE
WJ10B	27.4	3.62	7.55	.7	.27	1.0	68.6	TRACHYTE
N420A	28.3	3.63	7.77	.7	.27	1.0	67.4	TRACHYTE
N421A	28.5	3.66	7.79	.7	.26	.9	68.1	TRACHYTE

TABLE 45E.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
ST. HELENA ISLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
N.E. VOLCANO								
809	22.2		N.A.	.6	.23	1.1		BASALT
S.W. VOLCANO								
743	14.5		N.A.	.6	.21	1.5		ANKARAMITIC DYKE
785	15.1		N.A.	.5	.16	1.1		ANKARAMITE
179	16.5		N.A.	.6	.23	1.4		ANKARAMITE BASALT
706	22.7		N.A.	.9	.32	1.4		BASALT
ST.H1	20.3		N.A.	.7	.23	1.1		TRACHYBASALT
ST.H2	22.7		N.A.	.8	.29	1.3		TRACHYBASALT
403	32.3		N.A.	.6	.23	.7		PHONOLITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45F.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
GOUGH ISLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
G 133	13.7	3.09	4.42	.4	.16	1.1	22.7	PICRITE BASALT
G 121	11.0	2.53	4.34	.4	.13	1.2	19.5	PICRITE BASALT
G 111(1)	19.8	2.40	8.22	.6	.23	1.2	34.5	OLIVINE BASALT
G 111(2)	19.1	2.61	7.30	.6	.22	1.2	39.7	OLIVINE BASALT
G 13	19.4	2.44	7.96	.6	.22	1.1	36.2	OLIVINE BASALT
G 22(1)	22.2	2.41	9.20	.8	.24	1.1	41.1	TRACHYBASALT
G 22(2)	21.8	2.52	8.64	.8	.28	1.3	41.3	TRACHYBASALT
G 14	20.8	2.80	7.40	.8	.29	1.4	44.9	TRACHYBASALT
N435A	21.7	2.79	7.79	.8	.28	1.3	44.6	TRACHYBASALT
G 121C	22.6	2.90	7.76	.8	.29	1.3	48.3	TRACHYBASALT
G 15A	23.1	2.83	8.16	.8	.28	1.2	52.7	TRACHYBASALT
N437A	22.0	2.50	8.82	.8	.28	1.3	54.7	TRACHYBASALT
G 164	22.1	2.44	9.06	.7	.27	1.2	55.0	TRACHYBASALT
G 25	26.0	2.94	8.81	.8	.28	1.1	59.7	TRACHYANDESITE
G 15	24.1	2.47	9.74	.7	.26	1.1	64.2	TRACHYANDESITE
G 86	25.6	2.88	8.86	.7	.26	1.0	66.5	TRACHYANDESITE
G 114	24.1	2.48	9.68	.7	.25	1.0	79.3	ALKALI FELSPAR TRACHYTE
G 147	30.8	3.39	9.06	.6	.24	.8	87.9	AEGIRINE-AUGITE TRACHYTE
N436A	43.2	4.75	9.10	.6	.25	.6	83.3	AEGIRINE-AUGITE TRACHYTE
G 19C	41.0	4.40	9.32	.9	.25	.6	86.8	AEGIRINE-AUGITE TRACHYTE

TABLE 45G.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
TRISTAN DA CUNHA GROUP OF ISLANDS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
TRISTAN DA CUNHA								
OLDER LAVAS								
114(1)	19.0	2.97	6.38	.7	.24	1.3	22.6	ANKARAMITE
114(2)	20.1	2.89	6.95	.7	.25	1.2	27.5	ANKARAMITE
6(1)	22.4	2.98	7.49	.7	.25	1.1	27.9	OLIVINE BASALT
6(2)	22.5	2.99	7.53	.9	.33	1.5	28.0	OLIVINE BASALT
N443A	21.2	2.57	8.24	.7	.24	1.1	37.7	TRACHYBASALT
622(1)	22.3	2.47	9.03	.6	.23	1.0	43.3	TRACHYBASALT
622(2)	21.1	2.39	8.82	.9	.30	1.4	43.2	TRACHYBASALT
21(1)	21.7	2.41	9.01	.6	.23	1.0	43.0	TRACHYBASALT
21(2)	21.8	2.45	8.88	.9	.30	1.4	44.4	TRACHYBASALT
351(1)	21.2	2.33	9.07	.6	.22	1.0	45.9	TRACHYBASALT
351(2)	21.6	2.37	9.10	.8	.30	1.4	48.4	TRACHYBASALT
YOUNGER LAVAS (1961)								
N441A	21.4	2.06	10.36	.7	.26	1.2	68.4	TRACHYANDESITE
617(1)	21.5	2.13	10.09	.7	.25	1.2	69.8	TRACHYANDESITE
617(2)	22.1	2.15	10.26	.7	.26	1.2	69.7	TRACHYANDESITE
N442A	20.8		N.A.	.7	.25	1.2		TRACHYANDESITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45H.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
TRISTAN DA CUNHA GROUP OF ISLANDS.
CONT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NIGHTINGALE								
420(1)	24.1	2.52	9.53	.6	.23	1.0	81.0	PLAGIOCLASE TRACHYTE
420(2)	24.1	2.47	9.77	.7	.25	1.0	79.7	PLAGIOCLASE TRACHYTE
439(1)	22.7	2.10	10.79	.6	.21	.9	90.3	ALKALI FELSPAR TRACHYTE
439(2)	23.6	2.33	10.13	.6	.22	.9	87.2	ALKALI FELSPAR TRACHYTE

TABLE 45I.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
MADEIRA ISLAND, FERNANDO DE NORONHA ISLAND AND VEMA SEAMOUNT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MADEIRA ISLAND								
MAD 7	18.8		N.A.	.6	.23	1.2		ANKARAMITIC MELABASALT
MAD 2	21.4		N.A.	.6	.23	1.1		OLIVINE BASALT
MAD 20	22.6		N.A.	.8	.29	1.3		BASALT
MAD 8	21.4		N.A.	.7	.26	1.2		LATIANDESITE
MAD 19	23.4		N.A.	.7	.24	1.0		LATITE
MAD 22	38.0		N.A.	.5	.21	.6		FELSITE
FERNANDO DE NORONHA ISLAND								
FN 83	18.0		N.A.	.6	.23	1.3		UNKNOWN
FN 27-3	18.3		N.A.	.6	.22	1.2		UNKNOWN
FN 23-3	19.2		N.A.	.6	.23	1.2		UNKNOWN
FN 12-2	30.0		N.A.	.6	.23	.8		UNKNOWN
VEMA SEAMOUNT								
EK 9A	24.2		N.A.	.6	.23	.9		PHONOLITE
EK 6/1	23.0		N.A.	.6	.23	1.0		PHONOLITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 45J.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
ISLAND OF TENERIFE, CANARY ARCHIPELAGO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MA.11	16.4		N.A.	.6	.22	1.3		ANKARAMITE
VILAFLOR COMPLEX								
22.66	20.6		N.A.	.4	.24	1.2		DYKE INTRUSIVE INTO VILAFLOR COMPLEX
MA.25	23.3		N.A.	.6	.19	.8		BASALT
MA.26	23.5		N.A.	.7	.26	1.1		PHONOLITE
LATER VOLCANOS								
MA.10	21.1		N.A.	.7	.17	.8		BASALT
TC 16	24.0		N.A.	.6	.23	1.0		PHONOLITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45K.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
FOGO ISLAND, CAPE VERDE ARCHIPELAGO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CV 908	17.9		N.A.	.6	.23	1.3		BASALT
CV 902	19.4		N.A.	.6	.23	1.2		BASALT
CV 911	18.9		N.A.	.6	.23	1.2		BASALT
CV 921	20.7		N.A.	.7	.25	1.2		BASALT
CV 1063	21.4		N.A.	.7	.25	1.2		BASALT
CV 916	21.1		N.A.	.7	.25	1.2		BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 45L.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
ICELAND.
SOUTH CENTRAL ICELAND

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LATE TERTIARY								
468	20.3	2.69	7.54	.7	.24	1.2	30.3	THOLEIITE
PLEISTOCENE TO RECENT - TORFAJOKULL								
466	19.0	2.33	8.13	.6	.22	1.2	42.8	BASALT
465	26.1	3.15	8.28	.6	.24	.9	81.4	DACITIC ANDESITE
426	25.6	3.07	8.34	.6	.22	.9	89.0	COMENDITE (OBSIDIAN)

TABLE 45M.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
ICELAND - CONT.
WESTERN ICELAND-SNAEFELLNES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LATE TERTIARY								
255	23.7	3.33	7.10	.7	.24	1.0	80.3	DACITE,IRON-RICH
MID-PLEISTOCENE								
496	17.4	2.08	8.38	.6	.23	1.3	34.4	BASALT
476	23.7	3.14	7.55	.8	.29	1.2	65.2	ANDESITIC BASALT
306	23.8	3.08	7.71	.8	.29	1.2	66.7	BASALTIC ANDESITE
LATE PLEISTOCENE TO RECENT								
446	14.6	1.77	8.23	.6	.21	1.5	23.1	OLIVINE BASALT
372A	12.6	1.50	8.43	.4	.16	1.2	24.2	OLIVINE BASALT
448	14.7	1.84	8.00	.6	.21	1.4	26.1	OLIVINE BASALT
391	17.3	2.04	8.44	.7	.23	1.4	23.4	BASALT
490	18.3	2.20	8.31	.7	.24	1.3	31.1	BASALT
410	19.9	2.29	8.68	.7	.25	1.2	40.1	BASALT
499	19.8	2.47	8.02	.7	.24	1.2	44.0	BASALT
376	22.2	2.44	9.06	.8	.28	1.2	63.7	ANDESITIC BASALT
407	26.3	3.30	7.97	.6	.23	.9	93.3	RHYOLITE

TABLE 45N.

GALLIUM IN ROCKS FROM ISLANDS IN THE ATLANTIC OCEAN.
JAN MAYEN ISLAND.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
PRE-TILLITE LAVAS									
SJ 1A	SOR JAN	18.4		N.A.	.7	.23	1.3		ALKALI OLIVINE BASALT
SJ 2B	SOR JAN	16.3		N.A.	.5	.18	1.1		LATITE ANDESITE
SJ 25B	SOR JAN	16.7		N.A.	.6	.23	1.4		ALKALI TRACHYTE
KAPP MUYEN GROUP									
SJ 14B	NORD JAN	11.6		N.A.	.4	.16	1.3		ALKALI MELABASALT
POST-TILLITE LAVAS									
NC 15	NORD JAN	10.9	2.57	4.24	.4	.16	1.4	17.0	ALKALI OLIVINE MELABASALT
NC 23	NORD JAN	15.5		N.A.	.6	.22	1.4		ALKALI OLIVINE BASALT
NC 34A	NORD JAN	19.7		N.A.	.7	.24	1.2		ALKALI OLIVINE BASALT
JB 11	NORD JAN	16.9		N.A.	.5	.18	1.1		BIOTITE LATITE ANDESITE
NORDKAPP GROUP									
NC 30C	NORD JAN	18.0		N.A.	.6	.23	1.3		ALKALI OLIVINE BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 46A.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
EASTER ISLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
17543	23.6	2.30	10.28	.9	.31	1.3	28.6	ALKALI BASALT
17678	21.5	2.23	9.65	.6	.23	1.1	39.0	HAWAIITE
17557	21.2	2.54	8.34	.7	.24	1.1	40.4	HAWAIITE
17586	26.1	3.13	8.35	.8	.31	1.2	45.6	HAWAIITE
17636	27.6	3.37	8.19	.8	.29	1.1	63.6	BENMOREITE
17516	28.3	3.37	8.39	.7	.27	.9	71.1	BENMOREITE
17530(1)	35.5	3.84	9.24	.6	.24	.7	86.5	TRACHYTE
17530(2)	35.8	3.88	9.24	.6	.23	.7	86.5	TRACHYTE
17685	36.3	4.15	8.74	.6	.22	.6	88.1	RHYOLITE
17725	32.0	4.32	7.40	.6	.22	.7	90.1	RHYOLITE (OBSIDIAN)
17753	32.4	4.59	7.07	.6	.23	.7	92.5	RHYOLITE (OBSIDIAN)

TABLE 46B.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
GALAPAGOS GROUP OF ISLANDS.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
THOLEIITIC BASALTS									
E-35	CULPEPPER IS.	17.5	2.17	8.05	.6	.21	1.2	25.4	OLIVINE THOLEIITE
E-42	ALBERMARLE IS.	20.9	2.68	7.79	.6	.23	1.1	27.1	THOLEIITE
E-63	NARBOROUGH IS.	21.4	2.94	7.28	.7	.24	1.1	30.8	THOLEIITE
DIFFERENTIATED LAVAS									
E-78	JAMES IS.	23.2	2.97	7.81	.9	.31	1.3	38.4	FERROBASALT
E-44	JERVIS IS.	25.3	3.30	7.66	.9	.31	1.2	45.5	FERROBASALT
E-71	DUNCAN IS.	25.5	3.44	7.42	.8	.24	.9	56.4	ICELANDITE
E-49	JERVIS IS.	21.9	2.83	7.73	.7	.26	1.2	66.1	ICELANDITE
E-48	JERVIS IS.	29.8	3.86	7.70	.7	.25	.8	88.4	TRACHYTE (SILICEOUS)
ALKALI BASALTS									
E-1	INDEFATIGABLE IS.	17.0	1.99	8.52	.6	.23	1.3	30.6	ALKALI OLIVINE BASALT
E-4	ABINGDON IS.	19.6	2.52	7.77	.6	.23	1.2	34.4	ALKALI BASALT

TABLE 46C.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
GALAPAGOS GROUP OF ISLANDS.
CONT.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
PLUTONIC ROCKS									
E-67C	JERVIS IS.	17.2	1.46	11.77	.5	.20	1.2	21.1	GABBRO (EUCRITE?)
E-67J	JERVIS IS.	24.7	2.94	8.40	.8	.29	1.2	41.8	FERROGABBRO
E-67I	JERVIS IS.	22.4	2.58	8.70	.8	.30	1.3	48.0	FERROGABBRO
E-67D	JERVIS IS.	26.9	3.38	7.95	.8	.24	.9	66.4	FERROGABBRO
E-67N	JERVIS IS.	28.2	2.93	9.61	.6	.24	.9	75.8	SYENITE
MAFIC AND ULTRAMAFIC INCLUSIONS									
E-98	CHARLES IS.	5.2	2.03	2.56	.4	.11	2.2	3.8	PERIDOTITE
E-64	ALBERMARLE IS.	15.0	1.79	8.37	.5	.19	1.3	17.0	EUCRITE

TABLE 46D.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
CLARION ISLAND AND SOCORRO ISLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CLARION ISLAND								
C-38-57	20.8	2.12	9.80	.8	.30	1.4	34.6	BASALT
C-20-57	20.7	2.47	8.35	.6	.23	1.1	35.2	BASALT
C-37-57	20.3	2.41	8.41	.6	.23	1.1	36.7	BASALT
C-25-57	23.6	2.77	8.51	.9	.31	1.3	41.6	BASALT
C-26-57	23.0	2.88	7.96	.9	.30	1.3	41.9	BASALT
C-31-57	29.0	2.85	10.17	.8	.29	1.0	55.9	TRACHYBASALT
SOCORRO ISLAND								
S-133-57	21.4		N.A.	.6	.23	1.1		BASALT
S-10-55	22.2		N.A.	.8	.30	1.3		BASALT
S-96-57	20.3	2.38	8.52	.6	.23	1.1	40.0	BASALT
S-88-57	24.2	3.13	7.73	.9	.32	1.3	41.8	BASALT
S-55-57	24.2		N.A.	.9	.31	1.3		BASALT
S-72-57	26.0	3.36	7.74	.8	.30	1.2	49.8	TRACHYBASALT
S-77-57	25.6		N.A.	.8	.30	1.2		TRACHYBASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 46E.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN. ISLA DE COCO (COCOS ISLAND), PITCAIRN ISLAND AND THE JUAN FERNANDEZ ARCHIPELAGO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ISLA DE COCO (COCOS ISLAND)								
CP 22	22.9	2.29	9.97	.7	.25	1.1	74.8	TRACHYANDESITE
PITCAIRN ISLAND								
18761	21.2		N.A.	.6	.22	1.0		BASALT
18782	26.7		N.A.	.8	.30	1.1		BASALT
18876	25.4		N.A.	.8	.30	1.2		BIOTITE MUGEARITE
18765	33.4		N.A.	.7	.28	.8		MUGEARITE/TRACHYTE
18739	38.1		N.A.	.7	.25	.7		TRACHYTE
JUAN FERNANDEZ ARCHIPELAGO								
18024	18.6		N.A.	.7	.24	1.3		PICRITE BASALT
17919	18.0	2.17	8.29	.6	.23	1.3	39.1	PICRITE BASALT
18001	23.0	2.93	7.83	.6	.23	1.0	32.6	BASALT
17862	22.0	2.57	8.57	.9	.31	1.4	35.6	BASALT
17956	21.9	2.67	8.19	.7	.24	1.1	38.1	BASALT
17851	22.5	2.58	8.71	.8	.30	1.4	41.9	BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 46F.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
TAHITI GROUP OF ISLANDS.
LAVAS.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BASIC END MEMBER									
I-52	TAHATI-NUI	18.5	2.72	6.79	.7	.23	1.3	25.5	OLIVINE AUGITE BASALT
MAIN SERIES									
I-70	TAIARAPU	26.8	2.99	8.95	.8	.30	1.1	63.7	APHYRIC TAHITITE
I-30	TAHATI-NUI	24.2	2.32	10.40	.7	.25	1.1	74.1	TRACHYTE
I-69	TAIARAPU	23.1	2.28	10.14	.6	.23	1.0	87.0	TRACHYTE
NEPHELINIC SERIES									
I-67	TAIARAPU	21.1	2.40	8.79	.7	.24	1.1	38.9	BASANITE
I-53	TAHATI-NUI	28.4	3.06	9.28	.8	.28	1.0	65.3	TAHITITE
I-45	TAHATI-NUI	31.6	2.71	11.64	.6	.23	.7	94.0	PHONOLITE

TABLE 46G.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
TAHITI GROUP OF ISLANDS.
PLUTONIC ROCKS.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NEPHELINIC SERIES									
I-60	TAIARAPU	24.6	4.82	5.10	.8	.28	1.1	12.9	YAMASKITE
I-48	TAHATI-NUI	15.8	2.76	5.72	.6	.21	1.3	19.1	THERALITE
I-37	TAHATI-NUI	20.9	2.27	9.18	.7	.24	1.2	22.6	THERALITE
I-58	TAIARAPU	27.0	3.01	8.98	.8	.30	1.1	47.6	ESSEXITE
I-40	TAHATI-NUI	22.3	2.18	10.22	.8	.20	.9	52.3	ESSEXITE
I-62	TAIARAPU	21.9	2.43	8.98	.8	.28	1.3	55.4	MONZONITE
I-50	TAHATI-NUI	20.4	1.89	10.78	.4	.26	1.3	71.2	NEPHELINE SYENITE
I-46	TAHATI-NUI	21.6	1.94	11.11	.7	.24	1.1	74.2	SYENITE

TABLE 46H.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
HAWAIIAN GROUP OF ISLANDS.
THOLEIITIC SUITE.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ISLAND OF HAWAII									
C-214	MAUNA LOA(1855)	17.5	2.58	6.80	.5	.14	.8	21.2	THOLEIITE
C-213	MAUNA LOA(1899)	17.9	2.52	7.09	.6	.23	1.3	25.1	THOLEIITE
C-P	KILAUEA IKI(1959)	18.3		N.A.	.6	.23	1.2		THOLEIITE
ISLAND OF OAHU									
C-RD		35.0		N.A.	.6	.23	.7		RHYODACITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 46I.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
HAWAIIAN GROUP OF ISLANDS - CONT.
ALKALI SUITE.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ISLAND OF HAWAII									
C-71	MAUNA KEA	17.4	2.34	7.41	.6	.22	1.3	16.9	ANKARAMITE
C-222	HUALALAI	19.3	2.61	7.38	.7	.23	1.2	26.7	ALKALI OLIVINE BASALT
65992	HUALALAI	18.4	2.42	7.57	.7	.24	1.3	27.5	ALKALI OLIVINE BASALT
C-70	KOHALA MT.	22.7	2.46	9.22	.9	.31	1.4	33.4	ALKALI OLIVINE BASALT
C-72	MAUNA KEA	21.4	2.09	10.25	.6	.23	1.1	48.1	HAWAIITE
C-68	KOHALA MT.	20.1	1.96	10.28	.6	.15	.7	55.7	HAWAIITE
62-1	KOHALA MT.	18.6	1.83	10.12	.5	.19	1.0	74.3	TRACHYTE TRENDING TOWARDS MUGEARITE
C-TO	HUALALAI	23.8		N.A.	.6	.23	1.0		TRACHYTE OBSIDIAN
ISLAND OF MAUI									
C-116	WEST MAUI	23.2	2.41	9.61	.6	.23	1.0	86.0	TRACHYTE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 46J.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
HAWAIIAN GROUP OF ISLANDS - CONT.
NEPHELINIC SUITE.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ISLAND OF OAHU								
C-164	19.3	2.74	7.02	.7	.24	1.2	24.6	BASANITOID
C-195	15.6	2.40	6.48	.5	.18	1.1	33.1	NEPHELINITE
C-ML	23.3		N.A.	.8	.27	1.2		MELILITE NEPHELINITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 46K.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN.
SAMOAN ISLANDS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
SAVAAI ISLAND								
16651	20.9		N.A.	.6	.23	1.1		BASALT
UPOLU ISLAND								
24638	20.6		N.A.	.7	.24	1.2		BASALT
24635	25.7		N.A.	.8	.29	1.1		BASALT
TA'U ISLAND(MANU'A GROUP)								
TUNOA FORMATION								
11	24.0	3.05	7.86	.7	.20	.8	29.3	ALKALI OLIVINE BASALT
LATA FORMATION								
136	20.5	3.04	6.74	.6	.23	1.1	27.8	ALKALI OLIVINE BASALT
93	22.5	3.02	7.46	.7	.20	.9	28.9	ALKALI BASALT
107	23.2	3.02	7.70	.7	.21	.9	30.8	HAWAIITE
229	25.4	3.13	8.11	.7	.24	.9	37.7	HAWAIITE
110	28.1	2.81	10.00	.6	.20	.7	45.7	ALKALI BASALT TRANSITIONAL HAWAIITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 46L.

GALLIUM IN ROCKS FROM ISLANDS IN THE PACIFIC OCEAN. CHATHAM ISLAND AND JAPAN.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CHATHAM ISLAND								
18082	15.7		N.A.	.6	.22	1.4		BASALT
18069	20.6		N.A.	.7	.24	1.2		BASALT
18049	22.2		N.A.	.7	.24	1.1		BASALT
18145	26.6		N.A.	.8	.30	1.1		BASALT
18151-2	19.8		N.A.	.7	.25	1.3		LIMBURGITE
18053	37.6		N.A.	.6	.23	.6		TRACHYTIC PHONOLITE
18096	39.3		N.A.	.6	.25	.6		TRACHYTE
JAPAN								
HK 201	14.6		N.A.	.6	.21	1.4		HYPS OLIVINE THOLEIITIC BASALT
HK 501	16.5		N.A.	.7	.24	1.5		THOLEIITIC BASALT
HK 401	16.0		N.A.	.6	.17	1.0		ALKALI OLIVINE BASALT
HK 102	17.4		N.A.	.6	.22	1.3		ALKALI OLIVINE BASALT
HK 702	19.4		N.A.	.6	.23	1.2		HIGH ALUMINA BASALT
HK 701	21.1		N.A.	.6	.23	1.1		HIGH ALUMINA BASALT

*** N.A. = AL203 NOT KNOWN ***

TABLE 47A.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
ISLANDS IN THE COMORES ARCHIPELAGO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
GRAND COMORE								
GC-195	14.0	2.61	5.33	.5	.16	1.2	20.5	PICRITE BASALT
GC-21	13.9	2.04	6.81	.6	.21	1.5	23.7	PICRITE BASALT
GC-1	17.9	2.56	6.99	.6	.23	1.3	28.1	OLIVINE BASALT
GC-30	20.3	2.66	7.62	.6	.23	1.1	34.8	BASALT
MOHELI								
MO-26	15.1		N.A.	.5	.16	1.1		ALKALIC ANKARAMITE
GC-53	14.9	2.16	6.87	.5	.16	1.1	24.5	OLIVINE BASALT
GC-42	22.4	3.23	6.93	.7	.25	1.1	37.2	GABBRO
MO-22	32.1	3.10	10.35	.7	.25	.8	74.4	PHONOLITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 47B.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
HEARD ISLAND AND ISLAND OF NOUVELLE AMSTERDAM.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
HEARD ISLAND								
H 43	18.0		N.A.	.6	.22	1.2		LIMBURGITE
H 62	19.4		N.A.	.6	.23	1.2		BASALT
H 75	19.4		N.A.	.6	.23	1.2		TRACHYBASALT
H 22	21.4		N.A.	.8	.30	1.4		TRACHYBASALT
H 35	32.0		N.A.	.7	.28	.9		TRACHYANDESITE
H 33	31.6		N.A.	.8	.30	.9		TRACHYANDESITE
H 39	29.6		N.A.	.7	.25	.8		AEGIRINE-AUGITE TRACHYTE
ISLAND OF NOUVELLE AMSTERDAM								
F	15.2		N.A.	.6	.20	1.3		BASALT
E	16.3		N.A.	.6	.22	1.3		BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 47C.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
ISLANDS IN THE KERGUELEN ARCHIPELAGO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
KERGUELEN								
KER 4	14.3		N.A.	.5	.19	1.3		AMYGDALOIDAL BASALT
KER 2	16.2		N.A.	.6	.23	1.4		BASALT ?
KER 3	17.1		N.A.	.6	.23	1.3		BASALT ?
KER 60	18.7		N.A.	.5	.19	1.0		UNKNOWN
KER 27	19.7		N.A.	.6	.21	1.0		UNKNOWN
KER 68	20.7		N.A.	.6	.21	1.0		UNKNOWN
87	20.1		N.A.	.6	.21	1.0		BASALT
KER 1	21.0		N.A.	.6	.23	1.1		BASALT
182	20.2		N.A.	.6	.21	1.0		BASALT
135	25.4		N.A.	.5	.18	.7		ANORTHOCLASE HORNBLENDE TRACHYTE
72	28.7		N.A.	.4	.17	.6		ANORTHOCLASE TRACHYTE
224	36.1		N.A.	.4	.16	.5		PHONOLITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 47D.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
ISLANDS IN THE KERGUELEN ARCHIPELAGO.
CONT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CROZET								
NOU A	14.4		N.A.	.5	.16	1.1		AUGITE BASALT
NOU C	19.0		N.A.	.7	.24	1.3		BASALT
NOU D	22.0		N.A.	.6	.23	1.1		ANDESITE BASALT
KER 6004	20.2		N.A.	.6	.23	1.2		UNKNOWN
KER 6002	19.0		N.A.	.6	.21	1.1		DYKE ROCK
KER 6008	21.7		N.A.	.7	.24	1.1		INTRUSIVE ROCK
KER 6001	24.2		N.A.	.6	.23	1.0		FLOW LAVA

*** N.A. = AL203 NOT KNOWN ***

TABLE 47E.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
PRINCE EDWARD ISLAND.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
OLDER LAVAS									
WJE 21	YOUNGEST	16.3	2.72	5.99	.6	.21	1.3	25.4	BASALT
WJE 22		19.8	2.75	7.18	.7	.23	1.2	30.6	BASALT
WJE 25		21.4		N.A.	.7	.24	1.1		BASALT
WJE 6		23.3		N.A.	.9	.31	1.3		BASALT
WJE 26		23.3	2.87	8.11	.9	.31	1.3	34.6	BASALT
WJE 24		24.1		N.A.	.7	.24	1.0		BASALT
WJE 11		24.1	2.72	8.85	.8	.30	1.3	40.4	TRACHYBASALT
WJE 23		25.0		N.A.	.9	.31	1.2		TRACHYBASALT
WJE 8	OLDEST	25.7	2.80	9.18	.8	.30	1.2	46.4	TRACHYBASALT
YOUNGER LAVAS									
WJE 14	YOUNGEST	21.9	2.53	8.65	.9	.31	1.4	39.8	TRACHYBASALT
WJE 33		23.3	2.64	8.81	.8	.30	1.3	39.0	TRACHYBASALT
WJE 28		24.3		N.A.	.8	.30	1.3		TRACHYBASALT
WJE 20	OLDEST	25.6	2.89	8.83	.8	.30	1.2	44.5	TRACHYBASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 47F.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
MARION ISLAND.
OLDER LAVAS.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
WJM 52		15.3	2.50	6.13	.6	.15	1.0	23.7	BASALT
WJM 51		18.4	2.22	8.28	.6	.21	1.2	29.2	BASALT
WJM 14		19.8		N.A.	.6	.22	1.1		BASALT
WJM 48		20.8		N.A.	.7	.23	1.1		BASALT
WJM 38		21.2	2.19	9.67	.7	.24	1.1	33.3	BASALT
WJM 39		21.3		N.A.	.7	.24	1.1		BASALT
WJM 6		21.7	2.23	9.75	.6	.23	1.1	31.0	BASALT
WJM 49		21.9		N.A.	.7	.24	1.1		BASALT
WJM 8		20.4		N.A.	.6	.23	1.1		TRACHYBASALT
WJM 7		21.2	2.17	9.74	.6	.23	1.1	41.6	TRACHYBASALT
WJM 21		23.1		N.A.	.6	.23	1.0		TRACHYBASALT
WJM 24		23.1		N.A.	.7	.24	1.0		TRACHYBASALT
WJM 65		23.6	2.57	9.16	.8	.30	1.3	43.5	TRACHYBASALT
WJM 19		23.8		N.A.	.6	.22	.9		TRACHYBASALT

*** N.A. = AL203 NOT KNOWN ***

TABLE 47G.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
MARION ISLAND - CONT.
YOUNGER LAVAS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
WJM 26	17.1	2.27	7.54	.6	.23	1.4	25.2	BASALT
WJM 43	17.3	2.23	7.74	.7	.23	1.4	27.6	BASALT
WJM 62	18.0	2.54	7.08	.6	.21	1.1	27.6	BASALT
WJM 47	19.6		N.A.	.6	.23	1.2		BASALT
WJM 22	19.9		N.A.	.6	.21	1.1		BASALT
WJM 50	22.5		N.A.	.7	.25	1.1		BASALT
WJM 60	23.0		N.A.	.7	.24	1.0		BASALT
WJM 41	20.0		N.A.	.7	.24	1.2		TRACHYBASALT
ABBOTT 1	21.1		N.A.	.9	.31	1.5		TRACHYBASALT
WJM 42	21.9	2.31	9.48	.7	.24	1.1	34.2	TRACHYBASALT
WJM 11	22.3	2.65	8.40	.7	.20	.9	36.2	TRACHYBASALT
WJM 27	22.8		N.A.	.7	.20	.9		TRACHYBASALT
WJM 67	23.1	2.63	8.77	.9	.30	1.3	41.7	TRACHYBASALT
WJM 5	24.5		N.A.	.7	.24	1.0		TRACHYBASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 47H.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
MASCARENE ISLAND GROUP.
MAURITIUS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
OLDER LAVAS								
F 28	14.1	2.92	4.81	.4	.16	1.1	18.1	OCEANITE
F 70	17.1		N.A.	.6	.21	1.2		BASALT
F 323	20.9	2.69	7.74	.7	.24	1.2	33.0	BASALT
F 56	23.0	2.86	8.05	.8	.30	1.3	48.8	BASALT (OLIGOCLASE)
F 228	23.3		N.A.	.9	.32	1.4		BASALT
F 190	22.5	2.39	9.39	.7	.26	1.2	60.3	TRACHYANDESITE
F 357	29.9	3.22	9.31	.6	.18	.6	85.6	TRACHYTE
F 328	28.0	2.78	10.07	.6	.23	.8	88.8	TRACHYTE
F 329	28.4		N.A.	.6	.23	.8		TRACHYTE
YOUNGER LAVAS								
F 41	18.2		N.A.	.6	.23	1.3		BASALT
F 330	19.4	2.40	8.06	.6	.23	1.2	23.6	BASALT
F 168	20.1		N.A.	.7	.23	1.2		BASALT
F 214	21.7		N.A.	.7	.24	1.1		DOLERITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 471.

GALLIUM IN ROCKS FROM ISLANDS IN THE INDIAN OCEAN.
MASCARENE ISLAND GROUP - CONT.
REUNION AND RODRIGUEZ.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
REUNION								
H	11.5		N.A.	.4	.15	1.3		OCEANITE
G	23.3		N.A.	.6	.23	1.0		BASALT
RODRIGUEZ								
RD 27F	15.3	1.69	9.03	.6	.22	1.4	30.6	OLIVINE BASALT
RD 14	17.1	1.96	8.73	.6	.21	1.2	45.1	OLIVINE BASALT
RD 27C	22.0	2.48	8.88	.8	.28	1.3	32.4	PEGMATITIC VEIN
RD 26F	24.1	2.31	10.45	.7	.25	1.0	64.8	FINE-GRAINED (PHONOLITIC) VEIN

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 48A

SUMMARY OF Ga AND Ga/Al RATIOS FOR ROCKS OF VARYING DIFFERENTIATION INDEX FROM OCEANIC ISLANDS

D.I.	<30	30-45	45-60	60-80	80-90	>90
	'Basalt'	'Hawaiite'	'Mugearite'	'Benmoreite'	'Trachyte'	'Rhyolite'
Atlantic Ocean						
Ascension	--	22.1/2.6	23.9/2.6	23.9/2.7	28.5/3.5	39.1/5.7
Bouvetoya	--	22.0/2.6	26.4/3.2	28.0/3.6	31.3/4.4	--
Gough	12.4/2.8	20.7/2.6	23.2/2.7	24.6/2.6	38.3/4.2	--
Tristan da Cunha	21.0/3.0	21.6/2.5	21.4/2.4	21.5/2.1	--	--
Nightingale	--	--	--	--	23.6/2.4	--
Iceland	14.8/1.8	18.9/2.3	--	23.2/2.9	25.1/3.2	26.3/3.3
Jan Mayen	10.9/2.6	--	--	--	--	--
Pacific Ocean						
Easter	23.6/2.3	21.4/2.4	26.1/3.1	28.0/3.4	35.9/4.0	32.2/4.5
Galapagos	19.2/2.4	20.3/2.6	25.4/3.4	21.9/2.8	29.8/3.9	--
Clarion	--	21.7/2.5	29.0/2.9	--	--	--
Socorro	--	22.3/2.8	26.0/3.4	--	--	--
Juan Fernandez	--	21.0/2.6	--	--	--	--
Cocos	--	--	--	22.9/2.3	--	--
Tahiti (Main)	--	18.5/2.7	26.8/3.0	24.2/2.3	23.1/2.3	--
(Neph.)	--	21.1/2.4	--	28.4/3.1	31.6/2.7	--

contd.

TABLE 48B

D.I.	<30	30-45	45-60	60-80	80-90	>90
	'Basalt'	'Hawaiite'	'Mugearite'	'Benmoreite'	'Trachyte'	'Rhyolite'
Pacific Ocean contd						
Hawaii (Thol.)	17.7/2.6	--	--	--	--	--
(Alk.)	18.4/2.5	22.7/2.5	20.8/2.0	18.6/1.8	--	--
(Neph.)	19.3/2.8	15.6/2.4	--	--	--	--
Samoa	22.3/3.0	25.6/3.0	--	--	--	--
Indian Ocean						
Comores	15.2/2.3	21.4/3.0	--	32.1/3.1	--	--
Prince Edward	16.3/2.7	23.0/2.7	25.7/2.8	--	--	--
Marion	17.2/2.4	22.0/2.4	--	--	--	--
Rodriguez	--	16.2/1.8	--	--	--	--
Mauritius	16.8/2.7	20.9/2.7	22.8/2.6	--	29.0/3.0	--

In each case the figures, e.g. 22.1/2.6, represent 22.1 ppm Ga and a Ga/Al ratio of 2.6×10^{4}.

TABLE 49

SUMMARY OF PARTITION COEFFICIENTS FOR GALLIUM IN MINERALS FROM BASIC ROCKS

	Ankaramite	Alkali Basalt	Trachybasalt	Oceanite	Alkali Olivine Basalt	Tholeiite
Plagioclase						
Ga ppm	--	23.5(12)	27(1)	--	--	18.8(2)
Ga/Al x 10^4	--	1.47(12)	1.89(1)	--	--	1.07(2)
D_{Ga}	--	0.98(12) 0.84-1.27	1.13(1) --	--	--	0.98(2) 0.95-1.00
Pyroxene						
Ga ppm	7.4(5)	9.8(6)	11(1)	--	14.5(1)	--
Ga/Al x 10^4	3.7(5)	4.7(6)	4.2(1)	--	4.0(1)	--
D_{Ga}	0.36(5) 0.30-0.41	0.41(6) 0.35-0.49	0.40(1)	--	0.58(1)	--
Olivine						
Ga ppm	1(1)	--	--	1(2)	--	--
Ga/Al x 10^4	1.28(1)	--	--	1.4(2)	--	--
D_{Ga}	0.04(1)	--	--	0.04(2) 0.04-0.05	--	--

Data summarised from Goodman (1972). Number of determinations in brackets.

TABLE 50

CALCULATIONS OF Ga DISTRIBUTION IN PARENT/DAUGHTER RELATIONSHIPS FOR ROCKS OF INCREASING D.I. FROM GOUGH ISLAND

	G13 to G164 Ol-basalt to Trachybasalt			G164 to G15 Trachybasalt to trachyandesite			G15 to G114 Trachyandesite to trachyte	
	W.F.	D^*_{Ga}		W.F.	D^*_{Ga}		W.F.	D^*_{Ga}
Plag (An57)	0.39	1.20	(An54)	0.42	1.20	(An52)	0.54	1.20
Pyx	0.30	0.41		0.18	0.41		0.36	0.41
Ol	0.18	0.05		0.23	0.05		0.00	
Mt	0.10	2.00		0.07	2.00		0.09	2.00
Il	0.03	0.05		0.10	0.05		0.01	0.05
	1.00			1.00			1.00	
	F = 0.52			F = 0.77			F = 0.52	
	D^{mix}_{Ga} = 0.80			D^{mix}_{Ga} = 0.73			D^{mix}_{Ga} = 0.98	
	C^l/C^o = 1.14			C^l/C^o = 1.07			C^l/C^o = 1.01	
	Ga in G13 = 19.4 ppm			Ga in G164 = 22.1			Ga in G15 = 24.1	
	Ga in G164 (calc.) = 22.1 ppm			Ga in G15 (calc.) = 23.7 ppm			Ga in G114 (calc.) = 24.3	
	Ga in G164 (meas.) = 22.1 ppm			Ga in G15 (meas.) = 24.1			Ga in G114 (meas.) = 24.1	

W.F. = weight fractions of minerals (from computer program MIXER) which must be removed from the parent rock by crystal fractionation to derive daughter rock. D^*_{Ga} = partition coefficient for Ga between mineral and liquid. F = fraction of liquid remaining.

TABLE 51

GALLIUM DISTRIBUTION IN ISLAND ROCKS FOR WHICH NO DIFFERENTIATION INDICES ARE AVAILABLE

Island	'Hawaiite'	'Mugearite'	'Benmoreite'	'Trachyte'
Atlantic Ocean				
Azores (Flores)	17.2	--	18.6	20.6
Madeira	22.0	22.4	--	--
Tenerife	22.2	--	--	--
Cape Verde	19.9	--	--	--
Jan Mayen	17.9	16.9	16.3	--
St. Helena	22.0	--	32.3	--
Pacific Ocean				
Pitcairn	24.0	25.0	--	38.0
Chatham	21.3	--	--	--
Japan	16.1	--	--	--
Indian Ocean				
Heard	19.4	20.4	31.8	29.6
Amsterdam	15.8	--	--	--
Kerguelen	18.7	--	--	27.1
Crozet	20	--	--	--
Reunion	23.3	--	--	--

See Table 48 and text for explanation of rock types.

TABLE 52.

GALLIUM IN ROCKS FROM THE LOSBERG INTRUSION, FOCHVILLE, TRANSVAAL.

SAMPLE	NAME	HEIGHT(FT.)*	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LB-53		0	5.6	1.85	3.04	.3	.09	1.6	6.4	HARZBURGITE
LB-54		10	5.2	1.75	2.97	.3	.09	1.8	5.9	HARZBURGITE
LB-55		20	5.9	1.72	3.44	.3	.09	1.6	8.0	HARZBURGITE
LB-57		40	5.6	1.74	3.22	.3	.07	1.2	8.0	HARZBURGITE
LB-2		50	6.2	1.61	3.83	.3	.10	1.6	9.6	HARZBURGITE
LB-4		60	7.2	1.84	3.91	.3	.08	1.0	14.8	QUARTZ NORITE
LB-6		70	12.2	1.49	8.20	.5	.16	1.3	22.3	QUARTZ NORITE
LB-7		80	12.4	1.70	7.30	.4	.16	1.3	22.3	QUARTZ NORITE
LB-10		90	13.2	1.80	7.30	.5	.17	1.3	26.8	QUARTZ GABBRO
LB-11		120	13.3	1.91	6.97	.5	.17	1.3	28.1	QUARTZ GABBRO
LB-68		140	13.4	1.93	6.91	.5	.17	1.3	29.7	QUARTZ GABBRO
LB-12		160	13.8	1.95	7.04	.5	.17	1.2	32.2	QUARTZ GABBRO
LB-35		210	13.6	1.96	6.94	.5	.12	.9	34.3	QUARTZ GABBRO
LB-13		240	14.0	2.08	6.72	.5	.18	1.3	37.1	QUARTZ GABBRO
LB-27		270	10.4	2.07	5.03	.4	.08	.8	27.8	QUARTZ GABBRO
LB-31		290	11.0	1.89	5.81	.4	.10	.9	24.8	QUARTZ GABBRO
LB-24		340	10.6	1.97	5.36	.4	.09	.9	27.2	QUARTZ GABBRO
LB-42		390	11.8	1.85	6.39	.4	.07	.6	28.2	QUARTZ GABBRO

* HEIGHT(FT.) = HEIGHT IN FEET ABOVE BASE OF INTRUSION.

TABLE 53.

GALLIUM IN ROCKS FROM THE KOMATIPOORT INTRUSION, LEBOMBO MONOCLINE, SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
FIRST INTRUSIVE PHASE								
L 15	23.1	2.88	8.01	.8	.28	1.2	54.4	FELSPATHIC GABBRO
O 11	24.6	2.68	9.19	.8	.30	1.2	36.9	FELSPATHIC GABBRO
SECOND INTRUSIVE PHASE								
A 17	17.7	1.84	9.63	.6	.22	1.2	17.2	OLIVINE GABBRO
A 15	22.1	3.00	7.38	.9	.32	1.4	27.7	OLIVINE GABBRO
A 11	17.4	1.69	10.28	.6	.21	1.2	19.2	LAMINATED GABBRO
CA 17	24.6	4.14	5.95	1.0	.37	1.5	27.5	LAMINATED GABBRO
CA 16	25.2	4.20	6.00	.8	.28	1.1	28.3	LAMINATED GABBRO
CA 14	27.1	3.58	7.57	.9	.33	1.2	39.7	GRANOPHYRIC GABBRO
O 17	28.0	3.34	8.37	.9	.32	1.1	47.5	GRANOPHYRIC GABBRO
CA 2	28.6	3.78	7.57	.9	.33	1.2	41.5	GRANOPHYRIC GABBRO
THIRD INTRUSIVE PHASE								
O 14	27.6	4.55	6.05	.9	.32	1.2	63.9	GRANOPHYRE
CA 10	28.1	4.67	6.02	.8	.31	1.1	61.6	GRANOPHYRE
IG 4	28.1	4.94	5.68	1.0	.35	1.3	38.3	GRANOPHYRE
CA 7	29.0	4.70	6.17	.9	.33	1.1	56.1	GRANOPHYRE

TABLE 54.

GALLIUM IN ROCKS FROM THE TROMPSBURG INTRUSION, SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
TG 1 3970	12.6		N.A.	.4	.15	1.2		GABBRO
TG 1 4069	20.4		N.A.	.6	.23	1.1		ANORTHOSITE
TG 3 4325	21.1		N.A.	.6	.23	1.1		GABBRO
TG 3 5275	19.9		N.A.	.6	.22	1.1		GABBRO
TG 3 5747	19.5		N.A.	.7	.25	1.3		ANORTHOSITE

SAMPLES ARE FROM TWO BOREHOLES, TG1 AND TG3.
SAMPLE NUMBERS INDICATE DEPTH IN EACH BOREHOLE IN FEET.

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 55A.

GALLIUM IN ROCKS FROM THE BUSHVELD IGNEOUS COMPLEX, SOUTH AFRICA. BASAL ZONE.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
15	1.8		N.A.	.3	.10	5.7		PYROXENITE
9	2.3		N.A.	.3	.10	4.3		PYROXENITE
99	2.9		N.A.	.3	.10	3.4		PYROXENITE
20A	1.6		N.A.	.3	.10	6.2		HARZBURGITE
102	1.5		N.A.	.4	.11	7.1		HARZBURGITE (FE-RICH OLIVINE)
82	3.7		N.A.	.3	.10	2.7		HARZBURGITE
20	4.9		N.A.	.3	.10	2.0		HARZBURGITE, FELSPAR-BEARING
19	5.9		N.A.	.3	.11	1.8		HARZBURGITE
14	6.1		N.A.	.4	.11	1.9		FELSPAR HARZBURGITE
67	8.8		N.A.	.4	.11	1.3		NORITE
98	12.4		N.A.	.4	.15	1.2		NORITE
83	15.6		N.A.	.5	.18	1.2		NORITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 55B.

GALLIUM IN ROCKS FROM THE BUSHVELD IGNEOUS COMPLEX, SOUTH AFRICA. CRITICAL ZONE.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
90A	.6		N.A.	.4	.13	23.0		DUNITE
100	1.6		N.A.	.4	.12	7.6		DUNITE
95	1.8		N.A.	.4	.12	6.8		SERPENTINISED HARZBURGITE
90	4.6		N.A.	.6	.21	4.5		HORTONOLITE DUNITE
91	5.3		N.A.	.4	.13	2.6		DIALLAGE PEGMATOID
ET3/270	3.9		N.A.	.4	.11	2.9		PYROXENITE
94	4.5		N.A.	.4	.11	2.5		PYROXENITE
ET3/169	6.3		N.A.	.4	.11	1.8		PYROXENITE
119	7.4		N.A.	.4	.12	1.6		NORITE PEGMATOID
97	11.2		N.A.	.4	.14	1.3		NORITE
87	12.0		N.A.	.4	.14	1.2		LAYERED NORITE
LIEB 50	12.3	1.37	9.00	.4	.14	1.1		NORITE
86	12.6		N.A.	.5	.17	1.3		NORITE
92	12.7		N.A.	.4	.13	1.1		NORITE
89	13.6		N.A.	.4	.13	1.0		LAYERED NORITE
5064	16.2		N.A.	.5	.17	1.0		ANORTHOSITE
88	17.5		N.A.	.5	.13	.7		SPOTTED ANORTHOSITE
28	19.0		N.A.	.5	.18	1.0		ANORTHOSITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 55C.

GALLIUM IN ROCKS FROM THE BUSHVELD IGNEOUS COMPLEX, SOUTH AFRICA. MAIN ZONE.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
49	4.7		N.A.	.4	.12	2.5		FELSPATHIC PYROXENITE
135	6.3		N.A.	.3	.11	1.7		FELSPATHIC PYROXENITE
84	13.4		N.A.	.4	.14	1.1		SPOTTED NORITE
81	14.6		N.A.	.4	.13	.9		SPOTTED NORITE
77	9.3		N.A.	.4	.12	1.3		LAYERED GABBRO
AB1/73	10.7		N.A.	.4	.12	1.1		GABBROID
W 4	12.3	1.47	8.39	.4	.14	1.1		GABBROID
AB1/4861	12.5		N.A.	.4	.14	1.1		GABBROID
80	13.3		N.A.	.4	.14	1.1		GABBRO
W 7	13.5	1.35	9.97	.4	.14	1.1		GABBROID
75	14.8		N.A.	.5	.19	1.3		GABBRO
76	15.7		N.A.	.5	.18	1.2		GABBRO
5087	15.8		N.A.	.4	.15	.9		GABBROID
74	16.2		N.A.	.5	.19	1.2		GABBRO
79	16.4		N.A.	.5	.18	1.1		GABBRO
78	16.9		N.A.	.6	.21	1.2		GABBRO
73	20.4		N.A.	.6	.26	1.3		GABBRO

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 55D.

GALLIUM IN ROCKS FROM THE BUSHVELD IGNEOUS COMPLEX, SOUTH AFRICA.
MAIN ZONE - CONT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LIEB 51	16.2	1.01	15.97	.5	.18	1.1		ANORTHOSITE
85	16.6		N.A.	.5	.18	1.1		MOTTLED ANORTHOSITE
71	17.6		N.A.	.5	.19	1.1		SPOTTED ANORTHOSITE
AB1/1588	17.8		N.A.	.5	.18	1.0		ANORTHOSITE
AB1/1864	19.4		N.A.	.5	.18	.9		ANORTHOSITE
72	19.6		N.A.	.6	.23	1.2		ANORTHOSITE
61	22.1		N.A.	.7	.25	1.2		ANORTHOSITE (SULPHIDE-BEARING)
26	22.3		N.A.	.7	.24	1.1		MOTTLED ANORTHOSITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 55E.

GALLIUM IN ROCKS FROM THE BUSHVELD IGNEOUS COMPLEX, SOUTH AFRICA. UPPER AND MARGINAL ZONES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
UPPPER ZONE								
70	13.4		N.A.	.4	.15	1.1		GABBRO
69	15.0		N.A.	.6	.20	1.3		GABBRO
VB 11	21.9		N.A.	.8	.28	1.3		GABBRO
46	21.4		N.A.	.7	.25	1.2		TROCTOLITE
60	18.8		N.A.	.6	.21	1.1		ANORTHOSITE (SULPHIDE-BEARING)
63	24.7		N.A.	.7	.26	1.1		ANORTHOSITE WITH HNBL AND MAGNETITE
VB 4	21.2		N.A.	.7	.26	1.2		DIORITE
117	22.5		N.A.	.7	.26	1.2		DIORITE
118	18.3		N.A.	.5	.18	1.0		GRANOPHYRE
MARGINAL ZONE								
61-46-70	8.9		N.A.	.4	.12	1.4		GABBROID
61-46-263	15.5		N.A.	.5	.16	1.1		GABBROID
3064	16.5		N.A.	.6	.18	1.1		GABBROID

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 56.

GALLIUM IN ROCKS FROM THE SKAERGAARD INTRUSION, EAST GREENLAND.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MARGINAL ROCKS								
E.G. 4526 NBG	9.0		N.A.	.4	.12	1.3		PICRITE
E.G. 1851 WBG	15.7	1.76	8.89	.6	.21	1.4	15.9	PERPENDICULAR FELSPAR ROCK
E.G. 4507 SBG	18.5	2.03	9.10	.6	.21	1.1	21.5	CHILLED OLIVINE GABBRO
LAYERED SERIES								
E.G. 4328 UZC	21.0		N.A.	.6	.22	1.0		FERRODIORITE
E.G. 5181 UZA	25.0	3.22	7.77	.7	.27	1.1	32.6	FERRODIORITE
E.G. 4427 MZ	21.8		N.A.	.6	.23	1.0		GABBRO
LATE DIFFERENTIATES								
E.G. 4332 UBG	34.4	5.81	5.92	.9	.33	.9	62.4	MELANOGRANOPHYRE
E.G. 4489 UBG	34.2	5.22	6.55	.4	.13	.4	70.9	TRANSITIONAL GRANOPHYRE
E.G. 3058 T.GR	16.3	2.34	6.97	.4	.16	1.0	92.7	ACID GRANOPHYRE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 57

COMPARATIVE GALLIUM DATA FOR ROCKS FROM THE SKAERGAARD INTRUSION

Sample	This Work	Vincent & Nightingale (1974)	Paster et al. (1974)	Baedecker et al. (1971)	Wager & Mitchell (1951)
4489	34.2	36.6			
4328	21.0	21.4			
4332	34.4	34.3			
5181	25.0	26.3	26		
4427	21.8	22.1	18		
4526	9.0	9.9			
4507	18.5	19.2	19	22.2	
3058	16.3				20
1851	15.7				15

All data in ppm.

TABLE 58.

GALLIUM IN ROCKS FROM THE GREAT DYKE, RHODESIA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
7228	1.4		N.A.	.3	.10	6.9		PYROXENITE
GA 1050 B	7.0		N.A.	.3	.11	1.5		PICRITE
GD-B	11.2		N.A.	.4	.11	1.0		GABBRO
GD-D	13.6		N.A.	.4	.14	1.0		GABBRO
GD-C	14.0		N.A.	.5	.17	1.2		GABBRO
GD-A	20.9		N.A.	.6	.22	1.1		GABBRO

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 59.

GALLIUM IN ROCKS FROM THE MESSUM IGNEOUS COMPLEX, SOUTH WEST AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ME 11	9.2		N.A.	.4	.12	1.3		OLIVINE EUCRITE
ME 5	11.7		N.A.	.4	.16	1.3		OLIVINE EUCRITE
ME 3	12.2		N.A.	.4	.15	1.2		OLIVINE EUCRITE
ME 4	13.3		N.A.	.4	.14	1.1		OLIVINE EUCRITE
ME 10	16.7		N.A.	.5	.19	1.1		ANORTHOSITE
ME 12	17.7		N.A.	.5	.19	1.1		ANORTHOSITE
ME 8	13.6		N.A.	.4	.15	1.1		BIOTITE-HYPERSTHENE GABBRO
ME 7	13.9		N.A.	.4	.15	1.1		BIOTITE-HYPERSTHENE GABBRO
ME 9	14.9		N.A.	.4	.16	1.0		BIOTITE-HYPERSTHENE GABBRO
ME 6	15.8		N.A.	.6	.20	1.3		BIOTITE-HYPERSTHENE GABBRO
OUTER LAVAS								
ME 1	14.8		N.A.	.5	.16	1.1		BASALT
ME 2	16.3		N.A.	.5	.16	1.0		BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 60A.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MAFIC CUMULATES								
OK 227	12.6	2.45	5.17	.5	.13	1.1	13.9	GABBRO-PICRITE (OLIVINE CUMULATE)
OK 221	15.1	2.53	5.96	.5	.18	1.2	16.5	GABBRO-PICRITE
SOK 110	14.0	2.59	5.40	.5	.16	1.2	15.8	GABBRO-PICRITE (MARGINAL)
OK 219	14.3	2.62	5.44	.4	.12	.8	15.8	GABBRO-PICRITE (SUBOPHITIC)
OK 220	13.8	2.70	5.10	.5	.17	1.2	17.8	GABBRO-PICRITE
OK 67	12.9	2.76	4.67	.4	.12	.9	14.5	GABBRO-PICRITE
OK 68	15.8	2.76	5.72	.4	.12	.8	18.5	GABBRO-PICRITE
OK 66	15.6	2.86	5.46	.4	.12	.8	20.1	GABBRO-PICRITE (OPHITIC)
OK 179	16.6	2.86	5.78	.6	.23	1.4	20.5	GABBRO-PICRITE
GRANULITISED MAFIC CUMULATES AND GABBROS								
OK 259	15.0	2.56	5.85	.5	.18	1.2	19.3	GABBRO-PICRITE (GRANULITISED)
OK 144	10.2	2.57	3.95	.4	.11	1.1	13.7	GABBRO-PICRITE (GRANULITISED)
OK 270	17.9	2.66	6.73	.7	.25	1.4	24.4	GABBRO-PICRITE(GRANULITISED,OPHITIC)
OK 271	13.1	2.72	4.81	.4	.11	.8	17.1	GABBRO-PICRITE (GRANULITISED)
OK 141	9.9	2.75	3.59	.4	.09	.9	13.0	GABBRO-PICRITE (GRANULITISED)
OK 29	14.8	2.89	5.11	.5	.17	1.2	14.9	GABBRO-PICRITE (GRANULITISED)
OK 252	15.4	2.95	5.22	.4	.12	.8	16.2	GABBRO-PICRITE (GRANULITISED)
SOK 93	13.7	1.85	7.37	.4	.16	1.1	26.8	OLIVINE GABBRO(GRANULITISED)PLAG CUM
SOK 168	18.5	2.08	8.91	.6	.23	1.3	26.4	OLIVINE GABBRO(OPHITIC,GRANULITISED)
SOK 100	12.0	2.63	4.57	.4	.12	1.0	12.1	OLIVINE GABBRO (GRANULITISED)

TABLE 60B.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
GRANULITISED MAFIC CUMULATES AND GABBROS (CONT.)								
OK 150	21.4	2.48	8.61	.7	.25	1.2	35.0	FERROGABBRO (GRANULITISED)
OK 148	20.9	2.71	7.70	.7	.25	1.2	27.3	OLIVINE FERROGABBRO (GRANULITISED)
OLIVINE GABBROS (RIDGE GABBROS)								
SOK 7	16.4	1.42	11.57	.6	.22	1.3	20.0	OLIVINE GABBRO
OK 193	15.7	1.49	10.58	.5	.15	1.0	18.3	OLIVINE GABBRO (OPHITIC)
OK 199	14.0	1.51	9.28	.4	.12	.8	14.2	OLIVINE GABBRO (OPHITIC)
OK 200	17.3	1.54	11.17	.6	.21	1.2	18.5	OLIVINE GABBRO (OPHITIC)
OK 182	14.6	1.57	9.31	.4	.16	1.1	16.9	OLIVINE GABBRO
OK 239	15.4	1.61	9.54	.6	.21	1.3	15.9	OLIVINE GABBRO
OK 235	15.0	1.64	9.15	.6	.21	1.4	19.5	OLIVINE GABBRO
OK 10	17.7	1.66	10.68	.6	.22	1.2	23.9	OLIVINE GABBRO
OK 11	17.8	1.72	10.34	.6	.23	1.3	24.1	OLIVINE GABBRO
OK 234	17.4	1.72	10.11	.6	.21	1.2	21.1	OLIVINE GABBRO (BANDED)
OK 146	15.0	1.73	8.62	.4	.16	1.0	18.2	OLIVINE GABBRO (CONTAMINATED)
OK 236	15.7	1.73	9.06	.5	.17	1.1	15.2	OLIVINE GABBRO (CHILLED)
SOK 36	15.8	1.75	9.05	.6	.15	1.0	16.7	OLIVINE GABBRO (CHILLED)
OK 195	15.6	1.75	8.90	.6	.21	1.3	16.3	OLIVINE GABBRO (SUBOPHITIC)
OK 149	16.6	1.76	9.40	.6	.22	1.3	19.9	OLIVINE GABBRO
OK 249	17.3	1.76	9.79	.6	.23	1.4	24.4	OLIVINE GABBRO (SUBOPHITIC)
OK 264	16.6	1.78	9.34	.6	.21	1.3	18.3	OLIVINE GABBRO

TABLE 60C.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
OLIVINE GABBROS (RIDGE GABBROS) (CONT.)								
OK 181	15.2	1.79	8.49	.4	.12	.8	19.2	OLIVINE GABBRO
OK 202	16.3	1.80	9.07	.6	.17	1.0	20.6	OLIVINE GABBRO
OK 7	13.1	1.81	7.22	.5	.17	1.3	15.4	OLIVINE GABBRO
OK 203	18.1	1.83	9.91	.6	.23	1.3	27.3	OLIVINE GABBRO (BANDED)
OK 2	20.5	1.85	11.06	.6	.23	1.1	28.6	OLIVINE GABBRO (BANDED)
OK 9	16.7	1.86	8.95	.7	.23	1.4	21.1	OLIVINE GABBRO
OK 1	16.6	1.87	8.90	.6	.23	1.4	26.5	OLIVINE GABBRO (BANDED)
OK 201	16.3	1.88	8.70	.6	.17	1.1	22.0	OLIVINE GABBRO
OK 265	15.2	1.88	8.07	.5	.17	1.1	22.2	OLIVINE GABBRO
OK 232	16.4	1.91	8.58	.6	.22	1.3	20.9	OLIVINE GABBRO
OK 208	17.2	1.97	8.73	.7	.24	1.4	24.3	OLIVINE GABBRO (BANDED)
OK 81	18.4	1.99	9.28	.6	.15	.8	24.6	OLIVINE GABBRO (BANDED)
OK 4	22.2	2.05	10.82	.7	.25	1.1	28.9	OLIVINE GABBRO (OPHITIC)
DIFFERENTIATED FERROGABBROS								
OK 274	16.9	1.37	12.33	.6	.21	1.3	42.6	FERROGABBRO (PLAG. CUMULATE)
OK 229	23.4	2.10	11.15	.8	.29	1.2	44.8	FERROGABBRO (OPHITIC,PLAG. CUMULATE)
OK 156	18.8	1.63	11.50	.6	.23	1.2	28.6	OLIVINE FERROGABBRO (AN = 57)
OK 80	19.0	1.80	10.55	.6	.23	1.2	32.4	OLIVINE FERROGABBRO
OK 256	17.2	1.90	9.06	.5	.18	1.1	28.6	OLIVINE FERROGABBRO
OK 13	16.7	2.07	8.05	.5	.18	1.1	31.4	OLIVINE FERROGABBRO

TABLE 60D.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
DIFFERENTIATED FERROGABBROS (CONT.)								
SOK 1	18.6	2.14	8.67	.7	.24	1.3	19.2	OLIVINE FERROGABBRO
OK 151	17.0	2.20	7.73	.6	.23	1.4	27.0	OLIVINE FERROGABBRO
OK 41	20.2	2.22	9.08	.7	.26	1.3	31.5	OLIVINE FERROGABBRO
OK 209	20.4	2.22	9.16	.7	.26	1.3	29.5	OLIVINE FERROGABBRO
OK 248	19.8	2.26	8.76	.6	.18	.9	25.0	OLIVINE FERROGABBRO (BANDED)
OK 20	16.6	2.34	7.08	.4	.12	.7	25.2	OLIVINE FERROGABBRO
OK 143	17.5	2.38	7.35	.6	.17	1.0	25.6	OLIVINE FERROGABBRO
OK 77	20.6	2.49	8.27	.8	.28	1.3	30.5	OLIVINE FERROGABBRO
OK 211	21.3	2.52	8.45	.8	.27	1.3	31.6	OLIVINE FERROGABBRO
OK 133	20.2	2.53	7.98	.7	.25	1.2	33.5	OLIVINE FERROGABBRO
OK 246	21.4	2.54	8.41	.6	.22	1.0	31.5	OLIVINE HYPERSTHENE FERROGABBRO
OK 45	21.8	2.75	7.91	.8	.28	1.3	34.5	OLIVINE HYPERSTHENE FERROGABBRO
SOK 106	21.6	2.90	7.43	.8	.27	1.2	35.1	OLIVINE HYPERSTHENE FERROGABBRO
OK 213	20.6	2.58	7.97	.7	.26	1.3	36.9	HYPERSTHENE FERROGABBRO
OK 48	19.8	2.60	7.61	.7	.26	1.3	35.6	HYPERSTHENE FERROGABBRO
OK 225	21.3	2.68	7.95	.7	.26	1.2	40.3	HYPERSTHENE FERROGABBRO
OK 245	21.3	2.69	7.91	.6	.21	1.0	35.0	HYPERSTHENE FERROGABBRO
OK 75	20.7	2.79	7.41	.8	.27	1.3	38.7	HYPERSTHENE FERROGABBRO
OK 76	20.5	2.80	7.32	.7	.25	1.2	33.1	HYPERSTHENE FERROGABBRO
OK 277	21.0	2.81	7.46	.7	.27	1.3	39.9	HYPERSTHENE FERROGABBRO
OK 50	20.8	2.81	7.38	.7	.27	1.3	40.8	HYPERSTHENE FERROGABBRO

TABLE 60E.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
DIFFERENTIATED FERROGABBROS (CONT.)								
SOK 109	21.5	2.66	8.05	.8	.30	1.4	60.3	HYPERSTHENE FERROGABBRO
SOK 112	22.1	2.81	7.85	.6	.16	.7	62.2	HYPERSTHENE FERROGABBRO XENOLITH
OK 74	22.2	2.53	8.79	.7	.25	1.1	43.5	PYROXENE DIORITE
OK 73	21.1	2.64	7.99	.7	.25	1.2	46.6	PYROXENE DIORITE
OK 134	21.4	2.77	7.74	.7	.21	1.0	43.7	PYROXENE DIORITE
OK 37	21.3	2.80	7.60	.7	.26	1.2	47.5	PYROXENE DIORITE
OK 43	21.0	2.81	7.48	.7	.25	1.2	48.6	PYROXENE DIORITE
OK 39	21.7	2.84	7.63	.7	.25	1.2	45.6	PYROXENE DIORITE
OK 51	22.6	2.87	7.87	.9	.31	1.4	56.6	DIORITE-MONZONITE
OK 61	20.9	2.56	8.14	.9	.31	1.5	54.9	MONZONITE
OK 223	21.2	2.63	8.07	.6	.24	1.1	55.6	MONZONITE
OK 64	21.8	2.70	8.08	.6	.24	1.1	62.2	MONZONITE (MARGINAL ACID ROCK)
OK 217	20.6	2.72	7.57	.7	.24	1.2	52.6	MONZONITE
OK 278	22.1	2.78	7.93	.7	.24	1.1	55.4	MONZONITE
OK 72	21.6	2.80	7.70	.7	.24	1.1	55.0	MONZONITE
OK 132	21.5	2.84	7.57	.7	.25	1.2	47.1	MONZONITE
OK 71	22.7	2.86	7.94	.6	.17	.8	61.3	MONZONITE
OK 52	21.5	2.76	7.78	.8	.30	1.4	66.0	ADAMELLITE (QUARTZ MONZONITE)
OK 218	21.6	2.77	7.78	.8	.28	1.3	72.2	ADAMELLITE (QUARTZ MONZONITE)
OK 59	21.5	2.80	7.69	.6	.23	1.1	62.0	ADAMELLITE (QUARTZ MONZONITE)

TABLE 6DF.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MARGINAL ACID ROCKS AND DYKES								
OK 258	13.8	1.51	9.12	.6	.21	1.5	77.6	ALKALI SYENITE
OK 260	13.2	1.51	8.73	.4	.15	1.1	69.7	ALKALI SYENITE
OK 251	14.2	1.61	8.81	.5	.19	1.3	74.5	ALKALI SYENITE
OK 154	15.3	1.63	9.36	.6	.21	1.4	74.1	ALKALI SYENITE
OK 138	15.9	1.77	8.96	.6	.22	1.4	73.8	ALKALI SYENITE (CONTAMINATED)
OK 266	16.6	1.81	9.12	.5	.18	1.1	72.3	ALKALI SYENITE
OK 36	19.8	2.39	8.27	.6	.22	1.1	54.1	ALKALI SYENITE (CONTAMINATED)
OK 250	23.7	2.51	9.45	.6	.24	1.0	88.8	ALKALI MICROSYENITE
OK 268	17.4	2.14	8.11	.5	.18	1.1	80.8	ADAMELLITE (MARGINAL, CONTAMINATED)
OK 269	18.0	2.19	8.19	.7	.25	1.4	77.8	ADAMELLITE (MARGINAL, CONTAMINATED)
OK 263	19.5	2.24	8.70	.7	.24	1.2	82.6	MICROADAMELLITE (DYKE)
OK 241	18.9	2.30	8.20	.6	.22	1.2	64.2	MICROADAMELLITE
OK 233	20.0	2.48	8.05	.6	.21	1.1	64.4	MICROADAMELLITE (DYKE)
OK 262	20.5	2.61	7.84	.7	.25	1.2	45.1	MONZONITE (CONTAMINATED ACID ROCK)
OK 54	21.7	2.80	7.74	.6	.15	.7	56.5	MONZONITE (MARGINAL ACID ROCK)
OK 272	17.6	2.00	8.79	.4	.13	.8	79.5	QUARTZ SYENITE (MARGINAL)
OK 240	20.7	2.35	8.77	.8	.30	1.4	69.4	QUARTZ SYENITE (MARGINAL)
OK 243	21.8	2.60	8.37	.8	.28	1.3	79.3	QUARTZ SYENITE (MARGINAL)

TABLE 60G.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
THOLEIITIC SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MARGINAL ACID ROCKS AND DYKES (CONT.)								
OK 261	18.8	2.13	8.79	.7	.24	1.3	85.7	MICROGRANITE (CONTAMINATED)
OK 228	22.1	2.98	7.41	.6	.24	1.1	89.2	MICROGRANITE (MARGINAL)
OK 197	21.1	2.50	8.45	.6	.23	1.1	90.7	APLITE (DYKE)
OK 254	21.2	2.70	7.84	.6	.23	1.1	95.1	APLITE (DYKE)
OK 5	22.6	2.71	8.35	.6	.18	.8	89.1	APLITE (DYKE)

TABLE 60H.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
ALKALI SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CONTAMINATED ALKALI OLIVINE GABBROS								
OK 162	19.6	2.49	7.84	.7	.25	1.3	27.6	ALKALI OLIVINE GABBRO (GRANULITISED)
OK 26	17.3	2.55	6.77	.6	.16	.9	24.9	ALKALI OLIVINE GABBRO (GRANULITISED)
OK 31	17.5	2.63	6.63	.6	.23	1.3	25.3	ALKALI OLIVINE GABBRO (GRANULITISED)
OK 23	16.4	2.66	6.16	.5	.18	1.1	22.5	ALKALI OLIVINE GABBRO (GRANULITISED)
OK 15	17.8	2.72	6.53	.6	.16	.9	22.3	ALKALI OLIVINE GABBRO (GRANULITISED)
OK 152	18.1	2.72	6.66	.6	.23	1.3	25.1	ALKALI OLIVINE GABBRO (GRANULITISED)
ALKALI OLIVINE GABBROS (CORE GABBROS)								
OK 38	19.1	2.32	8.21	.7	.26	1.4	26.4	ALKALI OLIVINE DOLERITE (DYKE)
OK 116	18.1	1.45	12.41	.6	.22	1.2	23.2	ALKALI OLIVINE GABBRO
SOK 137	19.1	1.60	11.97	.6	.23	1.2	30.2	ALKALI OLIVINE GABBRO
OK 106	12.9	1.68	7.70	.5	.17	1.3	12.1	ALKALI OLIVINE GABBRO (SUBOPHITIC)
OK 27	19.6	1.69	11.56	.6	.23	1.2	32.6	ALKALI OLIVINE GABBRO
OK 112	16.6	1.69	9.82	.6	.12	.7	19.7	ALKALI OLIVINE GABBRO
OK 237	19.1	1.71	11.15	.6	.23	1.2	25.8	ALKALI OLIVINE GABBRO (SUBOPHITIC)
OK 104	17.6	1.72	10.21	.6	.23	1.3	21.0	ALKALI OLIVINE GABBRO
OK 83	19.1	1.76	10.83	.7	.25	1.3	25.4	ALKALI OLIVINE GABBRO (SUBOPHITIC)
OK 103	19.3	1.77	10.93	.6	.23	1.2	39.7	ALKALI OLIVINE GABBRO
OK 88	18.7	1.83	10.21	.7	.25	1.4	24.6	ALKALI OLIVINE GABBRO (OPHITIC)
OK 84	17.0	1.95	8.73	.5	.18	1.1	19.5	ALKALI OLIVINE GABBRO
OK 117	19.6	1.97	9.95	.6	.18	.9	18.8	ALKALI OLIVINE GABBRO (SUBOPHITIC)

TABLE 601.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
ALKALI SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ALKALI OLIVINE GABBROS (CORE GABBROS) (CONT.)								
OK 97	18.8	2.03	9.27	.7	.23	1.2	13.6	ALKALI OLIVINE GABBRO
OK 99	18.6	2.09	8.86	.7	.24	1.3	14.7	ALKALI OLIVINE GABBRO
OK 101	18.1	2.11	8.58	.5	.14	.8	13.5	ALKALI OLIVINE GABBRO
SOK 134	18.8	2.12	8.87	.6	.15	.8	19.6	ALKALI OLIVINE GABBRO
OK 102	19.0	2.30	8.24	.7	.25	1.3	20.0	ALKALI OLIVINE GABBRO (BANDED)
OK 100	16.4	2.31	7.07	.5	.19	1.2	10.5	ALKALI OLIVINE GABBRO (BANDED)
OK 28	22.5	2.56	8.79	.7	.26	1.2	32.6	ALKALI OLIVINE GABBRO (CHILLED)
NEPHELINE OLIVINE GABBROS								
OK 212	19.0	2.10	9.06	.7	.25	1.3	41.8	ALKALI DOLERITE (DYKE)
OK 164	17.4	1.52	11.43	.6	.22	1.3	46.2	NEPHELINE OLIVINE GABBRO
OK 96	19.8	1.76	11.28	.7	.24	1.2	30.7	NEPHELINE OLIVINE GABBRO (OPHITIC)
OK 94	19.7	1.80	10.93	.6	.17	.8	31.4	NEPHELINE OLIVINE GABBRO (OPHITIC)
OK 92	19.3	1.82	10.63	.7	.24	1.2	33.6	NEPHELINE OLIVINE GABBRO
OK 159	14.6	1.95	7.49	.5	.17	1.2	25.5	NEPHELINE OLIVINE GABBRO
SOK 158	14.4	2.09	6.85	.5	.17	1.2	25.0	NEPHELINE OLIVINE GABBRO
OK 275	19.9	2.09	9.54	.7	.26	1.3	26.0	NEPHELINE OLIVINE GABBRO(SUBOPHITIC)
OK 163	14.3	2.45	5.83	.5	.18	1.3	21.8	NEPHELINE OLIVINE GABBRO

TABLE 60J.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
ALKALI SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ESSEXITES								
OK 168	17.2	1.73	9.95	.6	.22	1.3	61.5	ANDESINE ESSEXITE
OK 176	17.5	1.73	10.13	.5	.15	.9	61.7	ANDESINE ESSEXITE
SOK 195	17.1	1.74	9.83	.6	.22	1.3	57.3	ANDESINE ESSEXITE
OK 160	17.7	1.80	9.85	.6	.21	1.2	66.2	ANDESINE ESSEXITE (MARGINAL)
OK 177	17.8	1.96	9.04	.6	.22	1.2	62.2	ANDESINE ESSEXITE (MARGINAL)
OK 167	18.4	2.03	9.05	.6	.21	1.2	65.9	ANDESINE ESSEXITE (MARGINAL)
SOK 122	15.3	1.43	10.69	.5	.19	1.2	70.7	OLIGOCLASE ESSEXITE
OK 175	15.2	1.47	10.32	.5	.20	1.3	71.0	OLIGOCLASE ESSEXITE
OK 172	15.3	1.51	10.12	.6	.21	1.4	65.8	OLIGOCLASE ESSEXITE
OK 174	16.5	1.60	10.30	.5	.15	.9	72.9	OLIGOCLASE ESSEXITE
OK 170	16.1	1.66	9.73	.6	.21	1.3	58.2	OLIGOCLASE ESSEXITE
PULASKITES								
OK 178	14.5	1.46	9.90	.5	.18	1.3	83.7	PULASKITE
SOK 143	15.7	1.58	9.95	.5	.13	.8	82.1	PULASKITE
OK 231	16.0	1.62	9.88	.5	.18	1.1	83.8	PULASKITE
OK 166	16.0	1.63	9.80	.5	.18	1.1	86.6	PULASKITE
OK 161	18.4	2.02	9.10	.5	.19	1.0	88.8	PULASKITE DYKE

TABLE 60K.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
ALKALI SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
FOYAITES								
SOK 47	15.1	1.29	11.67	.5	.19	1.3	83.1	FOYAITE
OK 131	14.5	1.29	11.24	.6	.20	1.4	79.6	FOYAITE (BANDED)
OK 130	16.1	1.38	11.67	.5	.19	1.2	86.8	FOYAITE (BANDED)
OK 122	15.8	1.41	11.17	.5	.19	1.2	80.3	FOYAITE (PORPHYRITIC, MARGINAL)
OK 121	17.3	1.50	11.50	.5	.18	1.1	85.1	FOYAITE (PORPHYRITIC)
OK 127	20.5	1.80	11.38	.6	.23	1.1	88.0	FOYAITE (PORPHYRITIC)
OK 95	20.7	1.83	11.30	.7	.25	1.2	84.6	MICROFOYAITE (DYKE)
OK 93	19.2	1.94	9.90	.6	.21	1.1	81.1	MICROFOYAITE (DYKE)
SODALITE TINGUAITES								
OK 230	18.8	1.68	11.16	.6	.23	1.2	89.8	SODALITE TINGUAITE (TRACHYTOIDAL)
OK 169	20.3	1.80	11.26	.6	.23	1.1	86.3	SODALITE TINGUAITE (TRACHYTOIDAL)
SOK 41	21.7	1.88	11.53	.6	.23	1.0	88.9	SODALITE TINGUAITE (APHANITIC, DYKE)
SOK 42	23.7	2.49	9.49	.7	.26	1.1	84.5	SODALITE TINGUAITE (DYKE)
SOK 189	26.7	2.89	9.24	.7	.26	1.0	85.4	SODALITE TINGUAITE (DYKE)
OK 198	27.7	3.36	8.23	.6	.25	.9	90.8	BOSTONITE

TABLE 60L.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
ALKALI SERIES

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MELTEIGITES								
OK 125	15.4	1.50	10.24	.6	.22	1.4	42.5	MELTEIGITE
OK 123	15.6	1.53	10.19	.4	.16	1.0	61.3	MELTEIGITE
OK 118	11.6	1.57	7.36	.4	.14	1.2	29.0	MELTEIGITE
OK 124	12.9	1.77	7.24	.4	.14	1.1	30.4	MELTEIGITE
OK 126	13.0	1.89	6.89	.5	.17	1.3	28.0	MELTEIGITE
LAMPROPHYRES								
OK 108	13.9	1.67	8.31	.4	.16	1.1	44.7	MELANOCRATIC CAMPTONITE
OK 115	13.7	1.69	8.08	.4	.16	1.1	41.0	MELANOCRATIC CAMPTONITE
OK 113	14.7	1.73	8.50	.6	.21	1.4	46.6	CAMPTONITE
SOK 58	14.5	1.79	8.11	.4	.16	1.1	40.5	CAMPTONITE
OK 109	15.1	1.52	9.93	.6	.21	1.4	64.7	LEUCOCRATIC CAMPTONITE
SOK 57	16.6	1.52	10.92	.5	.19	1.2	73.5	LEUCOCRATIC CAMPTONITE
OK 114	14.7	1.62	9.03	.5	.19	1.3	53.3	LEUCOCRATIC CAMPTONITE
OK 47	15.1	1.49	10.17	.6	.20	1.3	61.0	CAMPTONITE (DYKE)
OK 158	14.2	1.87	7.61	.5	.17	1.2	39.5	CAMPTONITE (DYKE)

TABLE 60M.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
OLIVINE NEPHELINE MELILITITE SERIES
DYKE EQUIVALENTS

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
OK 205	9.1	1.36	6.71	.4	.12	1.3	36.6	NEPHELINE MELILITITE
SOK 54	13.2	1.67	7.85	.6	.21	1.6	41.4	MELANOCRATIC NEPHELINITE (DYKE)
SOK 85	11.8	2.11	5.60	.5	.15	1.3	27.6	ALNOITE
OK 32	13.2	2.17	6.05	.5	.16	1.2	33.8	ALNOITE (BANDED)
OK 21	17.8	2.36	7.53	.6	.17	1.0	40.2	NEPHELINE MONCHIQUITE (DYKE)
SOK 119	15.1	2.39	6.32	.9	.25	1.6	30.1	NEPHELINE MONCHIQUITE (DYKE)
OK 222	15.9	2.45	6.50	.4	.13	.8	28.1	NEPHELINE MONCHIQUITE (DYKE)

TABLE 60N.

GALLIUM IN ROCKS FROM THE OKONJEJE IGNEOUS COMPLEX, S.W.A.
KARROO ROCKS

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
OK 55	13.2	1.80	7.30	.5	.16	1.2		ARKOSE
OK 279	11.7	2.03	5.78	.4	.12	1.0		HORNFELS (BAKED KARROO ARKOSE)
OK 57	14.8	2.20	6.74	.5	.18	1.2		HORNFELS (BAKED KARROO ARKOSE)

TABLE 61.

GALLIUM IN ROCKS FROM THE DOROS IGNEOUS COMPLEX, SOUTH WEST AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
D 7	OUTER RING	12.0	3.31	3.61	.4	.14	1.2	14.1	PICRITE
D 9A	OUTER RING	21.1	2.37	8.90	.6	.21	1.0	22.8	OLIVINE GABBRO (CONTACT)
D 9	OUTER RING	25.4	2.44	10.37	.7	.27	1.1	26.8	OLIVINE FERROGABBRO
D 4	INNER RING	15.4	4.22	3.65	.4	.16	1.0	14.8	MELANOCRATIC PICRITE
D 6	INNER RING	24.3	2.37	10.27	.7	.27	1.1	23.5	OLIVINE GABBRO (BANDED)
D 5	INNER RING	24.8	2.38	10.42	.7	.27	1.1	26.3	OLIVINE GABBRO
D 2	CORE	24.9	3.38	7.36	.7	.26	1.1	24.0	PICRITE-GABBRO
D 3	CORE	30.9	2.54	12.16	.6	.25	.8	50.6	LEUCOCRATIC GABBRO (PLUG)
D 1		25.9	2.99	8.67	.8	.30	1.1	26.3	GABBRO (BANDED)

TABLE 62.

GALLIUM IN ROCKS FROM THE ERONGO IGNEOUS COMPLEX, SOUTH WEST AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
8E	20.6	2.81	7.34	.7	.25	1.2	75.7	GRANODIORITE
8A	19.0	2.53	7.49	.7	.24	1.3	76.6	GRANODIORITE
11A	19.6	2.70	7.27	.6	.24	1.2	76.7	QUARTZ PORPHYRY (RHYOLITE)
10A	19.1	2.57	7.42	.7	.24	1.3	78.4	QUARTZ FELDSPAR PORPHYRY
11C	19.2	2.62	7.32	.7	.25	1.3	82.1	QUARTZ FELDSPAR PORPHYRY
11B	18.8	2.58	7.28	.7	.24	1.3	83.1	QUARTZ FELDSPAR PORPHYRY

TABLE 63.

GALLIUM IN GRANITIC ROCKS FROM SOUTH WEST AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
GR 3	SALEM	18.2	2.28	7.96	.6	.23	1.2	81.8	PORPHYRITIC TWO MICA GRANITE
GR 1	SALEM	16.4	2.22	7.39	.5	.13	.8	87.7	BIOTITE GRANITE
GR 2	SALEM	16.7	2.29	7.28	.6	.22	1.3	89.2	BIOTITE GRANITE
GR 4	SALEM	18.2	2.20	8.24	.6	.21	1.1	90.1	BIOTITE GRANITE
GR 5	SALEM	17.2	2.35	7.29	.6	.22	1.3	91.1	APPLOGRANITE
GR 9	BRANDBERG	23.3	3.40	6.84	.7	.25	1.1	88.1	EPIDOTE HORNBLENDE GRANITE
GR 8	BRANDBERG	23.3	3.08	7.56	.6	.22	.9	90.5	TWO MICA GRANITE
GR 7	BRANDBERG	24.1	3.16	7.60	.6	.21	.9	91.9	GRANITE
GR 6	ERONGO	19.8	3.22	6.14	.6	.21	1.1	94.4	BIOTITE GRANITE
OK 190	OKONJEJE	26.6	3.74	7.12	.6	.23	.9	88.8	QUARTZ FELSDPAR PORPHYRY
OK 191	OKONJEJE	27.5	4.08	6.74	.6	.23	.8	91.2	QUARTZ FELDSPAR PORPHYRY
OK 282	OKONJEJE	26.6	3.90	6.81	.6	.23	.9	92.6	GRANOPHYRE
GR 11	KLEIN SPITZKOPPJE	38.9	5.64	6.90	.6	.23	.6	94.3	GRANITE

TABLE 64A.

GALLIUM IN ROCKS FROM MATSOKU PIPE, LESOTHO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
COARSE-GRAINED ROCKS								
LBM 9	1.1	.85	1.30	.3	.08	7.7		GARNET LHERZOLITE(CP)
LBM 10	.8	1.20	.66	.3	.06	7.6		GARNET LHERZOLITE(CP)
LBM 11	.5	.67	.75	.3	.05	9.8		GARNET LHERZOLITE(CP)
LBM 14	.8	.91	.88	.2	.08	10.6		GARNET LHERZOLITE(CP) ALTD
LBM 17	1.0	.77	1.30	.3	.08	8.5		GARNET LHERZOLITE(CP)
EVEN TEXTURED ROCKS								
LBM 20	< .3	<54.80	.01	.3				DUNITE
LBM 13	1.6	1.45	1.10	.3	.09	5.7		GARNET LHERZOLITE(CP)
LBM 21	.5	1.11	.45	.3	.09	18.4		GARNET LHERZOLITE(CP)
LBM 26	.3	.79	.33	.3	.08	32.0		GARNET LHERZOLITE(CP)
FLASER ROCKS								
LBM 16	1.0	1.50	.67	.3	.08	8.5		GARNET LHERZOLITE(CP)
LBM 32	3.9	1.54	2.49	.3	.10	2.6		GARNET LHERZOLITE(CP) MTSM

MTSM = METASOMATISED ALTD = ALTERED

TABLE 64B.

****
* GALLIUM IN ROCKS FROM MATSOKU PIPE, LESOTHO. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LBM 43	11.5	2.23	5.15	.4	.14	1.2		AMPHIBOLITE
LBM 54	14.3	2.00	7.13	.4	.16	1.1		ECLOGITE
LBM 100	7.3	4.10	1.78	.3	.10	1.4		KIMBERLITE
CUMULATES								
LBM 12	3.4	1.80	1.91	.3	.11	3.1		PYROXENITE
LBM 18	4.8	1.45	3.32	.3	.10	2.1		PYROXENITE
LBM 41	1.8	3.62	.50	.3	.08	4.7		ORTHOPYROXENITE
BANDED CUMULATES								
LBM 37	3.2	1.46	2.17	.3	.09	2.9		PYROXENITE
LBM 33A	3.2	1.26	2.55	.3	.10	3.1		PYROXENITE
LBM 33B	2.5	1.82	1.37	.3	.10	4.0		PYROXENITE (OPX-RICH)
LBM 33C	3.7	1.39	2.66	.3	.10	2.7		PYROXENITE
LBM 36A	2.1	1.21	1.71	.3	.10	4.8		PYROXENITE
LBM 36B	2.5	1.20	2.11	.3	.10	3.9		PYROXENITE

TABLE 64C.

GALLIUM IN ROCKS FROM MATSOKU PIPE, LESOTHO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NODULES WITH SHEETS OR VEINS								
LBM 22A	1.6	1.75	.92	.3	.09	5.7		GT LHERZOLITE(CP) FLASER
LBM 22B	4.5	1.96	2.30	.3	.10	2.2		GT LHERZOLITE(CP) MTSM
LBM 38A	1.3	2.96	.44	.3	.09	7.1		GT LHERZOLITE(CP)
LBM 38B	5.1	4.22	1.20	.3	.10	2.0		PYROXENITE MTSM
LBM 55A	1.9	2.94	.65	.3	.09	4.8		GT LHERZOLITE(CP)
LBM 60A	1.3	2.56	.51	.3	.09	7.1		GT LHERZOLITE(CP)
LBM 60B	5.3	2.55	2.07	.3	.10	1.9		GT LHERZOLITE(CP) MTSM
LBM 62B	5.5	3.97	1.39	.3	.11	2.1		PYROXENITE MTSM
LBM 87 B.A.2	3.7	2.56	1.44	.3	.10	2.7		GT LHERZOLITE(CP)
LBM 87 B.A.3	3.3	1.70	1.94	.3	.10	3.0		GT LHERZOLITE(CP)
LBM 87 B.A.1	5.8	2.02	2.87	.3	.10	1.7		GT LHERZOLITE(CP) MTSM
LBM 88 B.A.2	1.5	3.18	.47	.3	.09	6.1		GT LHERZOLITE(CP)
LBM 88 B.A.1	2.8	3.92	.71	.3	.08	3.0		OPX & CPX-RICH VEIN
LBM 88 B.A.3	1.3	2.73	.48	.3	.09	7.1		GT LHERZOLITE(CP)

MTSM = METASOMATISED

TABLE 64D.

GALLIUM IN ROCKS FROM MATSOKU PIPE, LESOTHO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NODULES WITH SHEETS OR VEINS (CONT.)								
LBM 90 B.A.2	1.3	1.90	.68	.3	.09	7.1		GT LHERZOLITE(CP) 'HOST'
LBM 90 B.A.3	3.7	2.47	1.50	.3	.10	2.7		CPX-RICH ZONE
LBM 90 B.A.4	1.8	2.38	.76	.3	.09	5.1		CPX-POOR, OL-RICH ZONE
LBM 90 B.A.5	2.8	2.34	1.20	.3	.09	3.3		CPX-POOR, OPX-RICH ZONE
LBM 90 B.A.6	3.6	2.13	1.69	.3	.10	2.7		CPX-RICH ZONE
LBM 90 B.A.1	2.7	2.25	1.20	.3	.09	3.4		COMPOSITE OF B.A.3-6
LBM 101 B.A.1	1.4	2.28	.61	.3	.09	6.6		GT LHERZOLITE(CP)
LBM 101 B.A.2	4.2	2.34	1.79	.3	.11	2.7		ZONE RICH IN MTSM MINERALS
LBM 108 B.A.1	2.0	1.87	1.07	.3	.09	4.6		GT LHERZOLITE(CP)
LBM 108 B.A.2	3.6	2.32	1.55	.3	.11	3.1		ZONE RICH IN MTSM MINERALS
LBM 131 B.A.1	4.8	3.06	1.57	.3	.11	2.2		WHOLE OF CPX-RICH SHEET
LBM 131 B.A.2	4.5	2.59	1.74	.3	.11	2.4		MARGINAL ZONE, CPX-RICH
LBM 131 B.A.3	4.2	3.32	1.26	.3	.11	2.5		INNER ZONE, OPX & OL-RICH
LBM 139 B.A.1	4.3	3.60	1.20	.3	.10	2.3		WHOLE OF CPX-RICH SHEET
LBM 139 B.A.2	5.2	2.64	1.97	.3	.10	1.9		MARGINAL ZONE, CPX-RICH
LBM 139 B.A.3	3.2	3.73	.86	.3	.09	2.9		INNER ZONE, OPX-RICH

MTSM = METASOMATIC

TABLE 64E.

GALLIUM IN ROCKS FROM MATSOKU PIPE, LESOTHO.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NODULES WITH SHEETS OR VEINS (CONT.)								
LBM 171A	1.3	2.19	.59	.3	.09	7.1		GT LHERZOLITE(CP)
LBM 171B	3.3	3.10	1.06	.3	.09	2.8		PYX-RICH BAND
LBM 172A	1.4	2.34	.60	.3	.08	6.1		GT LHERZOLITE(CP)
LBM 172B	5.6	1.93	2.89	.3	.10	1.8		PYX-RICH BAND

TABLE 65A.

GALLIUM IN XENOLITHS FROM KIMBERLITE PIPES.

SAMPLE NAME			PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ROBERTS VICTOR MINE										
RV 381			8.9	.97	9.16	.4	.13	1.5		ECLOGITE
RV 379			10.2	1.08	9.38	.4	.13	1.3		ECLOGITE
KRV 5			9.3	1.21	7.67	.4	.13	1.4		ECLOGITE
KRV 7			11.4	1.23	9.22	.4	.13	1.2		ECLOGITE
KRV 3			9.0	1.29	6.97	.4	.12	1.3		ECLOGITE
RV 374			8.8	1.33	6.63	.4	.13	1.4		ECLOGITE
RV 377			11.5	1.34	8.57	.4	.14	1.2		ECLOGITE
RV 380			10.0	1.42	7.03	.4	.12	1.2		ECLOGITE
KRV 2			11.3	1.47	7.66	.4	.14	1.3		ECLOGITE
KRV 1			11.1	1.48	7.45	.4	.14	1.3		ECLOGITE
RV 390/4			12.6	1.49	8.45	.5	.17	1.3		ECLOGITE
KRV 4			11.4	1.72	6.64	.4	.16	1.4		ECLOGITE
KRV 6			11.6	1.73	6.71	.4	.12	1.0		ECLOGITE
KRV 8			11.7	1.75	6.64	.4	.14	1.2		ECLOGITE
RV 378			13.3	1.95	6.84	.5	.16	1.2		ECLOGITE
JJG 41			11.3	1.41	8.00	.4	.12	1.1		ECLOGITE
HRV-17A	I	CA-RICH	10.5	1.05	10.00	.4	.15	1.4		ECLOGITE
HRV-17B	I	CA-RICH	10.1	1.05	9.63	.4	.15	1.5		ECLOGITE
HRV-17C	I	CA-RICH	14.6	1.41	10.32	.4	.16	1.1		ECLOGITE
HRV-17D	I	CA-RICH	17.7	1.28	13.81	.4	.14	.8		ECLOGITE

TABLE 658.

GALLIUM IN XENOLITHS FROM KIMBERLITE PIPES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
ROBERTS VICTOR MINE								
HRV-173 GT II MG-RICH	7.5	.78	9.58	.4	.13	1.8		ECLOGITE
HRV-173 CPX II MG-RICH	6.1	1.35	4.49	.4	.13	2.2		ECLOGITE
HRV-267 GT II MG-RICH	3.1	.46	6.72	.4	.13	4.1		ECLOGITE
HRV-267 CPX II MG-RICH	4.1	.89	4.66	.4	.13	3.1		ECLOGITE
HRV-77 OE I FE-RICH	11.3	1.91	5.93	.4	.15	1.3		ECLOGITE
HRV-77 M I FE-RICH	18.9	3.72	5.08	.4	.14	.7		ECLOGITE
HRV-110 OE I MG-RICH	9.7	1.22	7.90	.4	.15	1.5		ECLOGITE
HRV-110 M I MG-RICH	10.4	1.68	6.19	.4	.14	1.4		ECLOGITE
HRV-132 GT II MG-RICH	7.8	.85	9.16	.4	.13	1.7		ECLOGITE
HRV-132 CPX II MG-RICH	5.6	1.05	5.35	.4	.13	2.4		ECLOGITE
XRV 3	9.6		N.A.	.4	.12	1.3		KYANITE ECLOGITE
RV 372	11.2	.88	12.79	.4	.13	1.1		CORUNDUM ECLOGITE
RIETFONTEIN PIPE								
JJG 108	7.2	.84	8.61	.4	.12	1.7		ECLOGITE
JJG 106	8.4	1.89	4.43	.4	.12	1.4		ECLOGITE
JJG 105	8.2	1.01	8.16	.4	.13	1.5		ECLOGITE
JJG 107	11.5	1.13	10.18	.4	.14	1.2		KYANITE (?) ECLOGITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 65C.

GALLIUM IN XENOLITHS FROM KIMBERLITE PIPES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
JAGERSFONTEIN PIPE								
JAG 351	12.2	1.44	8.45	.4	.13	1.0		ECLOGITE
JAG 41	8.4		N.A.	.3	.11	1.4		ECLOGITE
CROWN MINE								
CR 1	11.1		N.A.	.4	.12	1.1		ECLOGITE
DE BEERS MINE								
108	15.0	3.39	4.41	.4	.13	.9		PHLOGOPITE NODULE
KAMFERSDOWN MINE								
JJG 248	10.3	11.81	.87	.3	.11	1.1		CLINOPYROXENE MEGACRYST

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 65D.

GALLIUM IN XENOLITHS FROM KIMBERLITE PIPES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MONASTERY MINE								
M (A)	6.1	4.61	1.33	.3	.11	1.7		CLINOPYROXENE MEGACRYST
MONASTERY 6	10.8	10.52	1.03	.5	.18	1.6		CLINOPYROXENE/ILMENITE NODULE
M (B)	13.6	12.72	1.07	.4	.15	1.1		CLINOPYROXENE/ILMENITE MEGACRYST
M (C)	20.6	41.31	.50	.7	.24	1.2		ILMENITE MEGACRYST
M (D)	12.9	1.15	11.24	.3	.11	.9		GARNET MEGACRYST

TABLE 65E.

GALLIUM IN XENOLITHS FROM KIMBERLITE PIPES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BULTFONTEIN PIPE								
BD 2344	.5	1.02	.49	.3	.08	17.0		GARNET LHERZOLITE
BD 2350	1.2	1.16	1.04	.3	.08	7.1		GARNET LHERZOLITE
BD 2404	.6	.72	.83	.3	.08	14.1		GARNET LHERZOLITE
BD 2451	1.2	1.81	.66	.3	.08	7.1		GARNET LHERZOLITE
BD 2415	.3	.55	.61	.3	.08	25.0		GARNET LHERZOLITE (SERPEN)
BD 2382	2.3	1.20	1.91	.3	.09	4.0		CPX-RICH GARNET LHERZOLITE
BD 2452	3.9	11.00	.35	.3	.10	2.5		OPAQUE-BEARING LHERZOLITE
BD 2329	< .3	< .58	.43	.3				CHROMITE HARZBURGITE
BD 2370	.4	.86	.47	.3	.08	21.2		CHROMITE HARZBURGITE
AJE 19	1.7	3.35	.51	.3	.08	5.0		RICHTERITE PERIDOTITE
JJG 360A	2.4	7.09	.34	.3	.09	3.8		RICHTERITE PERIDOTITE
12/172	5.1	10.95	.47	.3	.10	1.9		RICHTERITE PERIDOTITE
JJG 335	2.0	4.45	.45	.3	.08	4.2		PHLOGOPITE PERIDOTITE
JJG 344	1.7	6.30	.27	.3	.08	5.0		PHLOGOPITE PERIDOTITE

SERPEN = SERPENTINISED

TABLE 65F.

GALLIUM IN XENOLITHS FROM KIMBERLITE PIPES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
VISSER'S PIPE, TANZANIA								
TAN 1	13.7	1.95	7.03	.4	.15	1.1		ECLOGITE
WILSON'S MINE, TANZANIA								
TAN 501	14.0	1.97	7.09	.5	.17	1.2		ECLOGITE
TAN 503	12.1	1.11	10.88	.4	.15	1.2		KYANITE ECLOGITE

TABLE 66A.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
PREMIER MINE.
SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
TYPE I (GREY)								
JJG402	6.4	2.89	2.20	.3	.10	1.6		KIMBERLITE
JJG403	5.6	2.71	2.07	.3	.09	1.6		KIMBERLITE
JJG404	7.1	2.86	2.47	.3	.09	1.3		KIMBERLITE
JJG405	5.9	3.00	1.97	.3	.10	1.7		KIMBERLITE
TYPE II (BROWN)								
JJG408	6.9	2.71	2.53	.3	.10	1.4		KIMBERLITE
JJG409	7.1	2.80	2.53	.3	.10	1.4		KIMBERLITE
JJG410	6.4	2.72	2.37	.3	.10	1.5		KIMBERLITE
JJG411	7.1	2.88	2.48	.3	.10	1.4		KIMBERLITE
JJG412	6.8	2.87	2.37	.3	.10	1.5		KIMBERLITE
JJG413	5.9	2.76	2.14	.3	.10	1.7		KIMBERLITE
JJG414	6.3	3.01	2.10	.3	.10	1.6		KIMBERLITE
TYPE III (BLACK)								
JJG415	5.1	3.17	1.60	.3	.10	2.0		KIMBERLITE
JJG416	5.1	3.42	1.50	.3	.11	2.1		KIMBERLITE
JJG418	4.7	3.34	1.40	.3	.10	2.1		KIMBERLITE
JJG419	5.4	3.37	1.60	.3	.10	1.8		KIMBERLITE

TABLE 66B.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
BELLSBANK KIMBERLITES.
SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BOBBEJAAN FISSURE (BOBBEJAAN)								
JJG427	3.6	4.14	.87	.3	.11	3.0		KIMBERLITE
JJG432	4.6	4.70	.98	.3	.08	1.8		KIMBERLITE
JJG433	5.0	3.69	1.37	.5	.17	3.4		KIMBERLITE
BOBBEJAAN FISSURE (DANCARL)								
JJG428	3.0	3.42	.88	.4	.11	3.7		KIMBERLITE
JJG429	2.4	3.45	.69	.3	.11	4.5		KIMBERLITE
JJG430	2.5	2.98	.83	.4	.11	4.3		KIMBERLITE
JJG431	2.7	2.42	1.13	.3	.11	3.9		KIMBERLITE
BOBBEJAAN FISSURE (HOLLIDAY & DE BRUYN)								
JJG438	2.9	3.00	.95	.3	.09	3.2		KIMBERLITE

TABLE 66C.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
BELLSBANK KIMBERLITES.
SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
WATER FISSURE								
JJG455	3.4	3.83	.90	.3	.10	2.9		KIMBERLITE
JJG456	3.5	3.90	.89	.3	.10	2.8		KIMBERLITE
JJG457	3.3	4.00	.83	.3	.10	3.0		KIMBERLITE
JJG458	3.5	3.97	.87	.3	.10	2.9		KIMBERLITE
JJG459	3.5	3.96	.87	.3	.10	2.9		KIMBERLITE
JJG460	3.3	3.99	.84	.3	.10	3.0		KIMBERLITE
JJG461	3.1	3.66	.85	.3	.10	3.2		KIMBERLITE
JJG462	3.4	3.80	.90	.3	.10	2.9		KIMBERLITE
JJG463	3.5	4.09	.86	.3	.10	2.8		KIMBERLITE
JJG464	3.3	3.68	.88	.3	.10	3.0		KIMBERLITE
MAIN FISSURE (DE BRUYN)								
JJG434	3.4	3.00	1.14	.3	.10	2.9		KIMBERLITE
JJG435	3.0	2.90	1.05	.3	.07	2.3		KIMBERLITE
JJG436	2.5	2.98	.84	.3	.10	3.9		KIMBERLITE
JJG437	6.1	4.32	1.41	.4	.11	1.9		KIMBERLITE
JJG439	4.3	3.93	1.10	.3	.11	2.4		KIMBERLITE
JJG440	6.9	2.69	2.56	.3	.11	1.5		KIMBERLITE
JJG441	3.1	2.90	1.06	.3	.10	3.2		KIMBERLITE

TABLE 66D.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MULLERSVLEI								
JJG445	10.2	2.99	3.40	.4	.11	1.1		KIMBERLITE
EBENHAEZER EAST								
JJG446	7.8	3.12	2.51	.3	.11	1.4		KIMBERLITE
JJG447	7.8	3.13	2.48	.3	.10	1.3		KIMBERLITE
JJG448	7.4	2.85	2.60	.3	.10	1.3		KIMBERLITE
JJG449	8.0	3.09	2.60	.3	.11	1.4		KIMBERLITE
JJG472	8.3	3.29	2.53	.3	.10	1.2		KIMBERLITE
EBENHAEZER WEST								
JJG450	9.7	2.54	3.81	.3	.11	1.1		KIMBERLITE
JJG451	9.8	2.65	3.69	.4	.13	1.3		KIMBERLITE
JJG452	9.4	2.57	3.65	.4	.13	1.4		KIMBERLITE
JJG453	9.4	2.72	3.46	.4	.13	1.4		KIMBERLITE
JJG454	8.1	2.82	2.89	.3	.11	1.3		KIMBERLITE

TABLE 66E.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
KOFFYFONTEIN								
JJG442	8.1	2.81	2.89	.3	.09	1.1		KIMBERLITE
JJG443	7.9	2.75	2.89	.3	.09	1.2		KIMBERLITE
JJG444	7.9	2.74	2.87	.3	.10	1.3		KIMBERLITE
JJG465	7.5	2.75	2.73	.3	.09	1.2		KIMBERLITE
JJG466	8.2	2.52	3.27	.3	.11	1.3		KIMBERLITE
JJG467	8.3	2.87	2.88	.3	.09	1.1		KIMBERLITE
JJG468	7.6	2.62	2.89	.3	.10	1.3		KIMBERLITE
JJG469	8.4	2.76	3.03	.3	.10	1.2		KIMBERLITE
JJG470	8.1	2.75	2.95	.3	.10	1.2		KIMBERLITE
JJG471	8.5	2.81	3.02	.3	.10	1.2		KIMBERLITE
BENFONTEIN KIMBERLITES								
S 3	< .4	< 1.54	.25	.4				CALCITE-RICH LAYER
S 8	1.5	1.43	1.06	.3	.08	4.9		OL-MT-PEROVSKITE CUMULATE
S 407/3	12.9	4.85	2.65	.4	.14	1.1		KIMBERLITE
S 5	32.0	6.57	4.87	.6	.21	.6		MT-PEROVSKITE CUMULATE
S 403/2	34.9	8.43	4.13	.6	.21	.6		MT-PEROVSKITE CUMULATE
MONASTERY								
1870	9.4	6.73	1.40	.4	.14	1.5		KIMBERLITE

TABLE 66F.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
KIMBERLITES SELECTED TO HAVE NO CRUSTAL CONTAMINATION.
SOUTH AFRICA AND LESOTHO.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MICA-RICH KIMBERLITES									
S 47	STAR MINE	5.2	3.03	1.70	.4	.11	2.2		KIMBERLITE
S 48	STAR MINE	4.5	2.44	1.83	.4	.11	2.5		KIMBERLITE
S 50	STAR MINE	5.0	2.79	1.78	.3	.11	2.1		KIMBERLITE
S 51	STAR MINE	5.9	3.93	1.51	.4	.11	1.9		KIMBERLITE
S 53	STAR MINE	3.4	2.87	1.18	.3	.11	3.1		KIMBERLITE
S 43	ZOUT-EN-ZUUR	9.4	3.75	2.50	.4	.11	1.2		KIMBERLITE
S 45	NEW ELANDS MINE	8.5	3.67	2.32	.4	.12	1.4		KIMBERLITE
S 46	NEW ELANDS MINE	9.8	4.23	2.31	.4	.12	1.2		KIMBERLITE
S 58	GORDONIA MINE	10.5	4.21	2.49	.4	.12	1.1		KIMBERLITE
S 72	JAGERSFONTEIN	5.7	3.73	1.53	.3	.11	1.9		KIMBERLITE
S 77	JAGERSFONTEIN	4.7	4.55	1.04	.3	.11	2.2		KIMBERLITE
S 223	HELAM MINE	8.4	4.19	2.01	.3	.11	1.3		KIMBERLITE
S 224	HELAM MINE	10.8	3.79	2.84	.4	.12	1.1		KIMBERLITE
S 225	HELAM MINE	10.1	3.63	2.77	.4	.11	1.1		KIMBERLITE
BD 768	HOLOLO PIPE	4.0	3.98	1.01	.3	.09	2.2		KIMBERLITE
NON-MICACEOUS KIMBERLITES									
S 308	WESSELTON	11.9	5.25	2.27	.4	.13	1.1		KIMBERLITE
S 61	DYKE, LOVEDALE	5.0	4.18	1.21	.3	.11	2.2		KIMBERLITE
S 277	KAO PIPE	17.4	11.70	1.49	.3	.11	.7		KIMBERLITE

TABLE 66G.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA.
KIMBERLITES SELECTED TO HAVE NO CRUSTAL CONTAMINATION.
SOUTH AFRICA AND LESOTHO.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NON-MICACEOUS CARBONATE-RICH KIMBERLITES									
S 25	DU TOITS PAN	5.1	3.73	1.37	.3	.11	2.1		KIMBERLITE
S 27	DU TOITS PAN	5.7	6.03	.95	.4	.11	2.0		KIMBERLITE
S 30A	WESSELTON	6.9	4.61	1.49	.3	.11	1.5		KIMBERLITE
S 33	WESSELTON	8.4	3.80	2.20	.4	.13	1.5		KIMBERLITE
CARBONATITIC KIMBERLITES									
S 211	PREMIER MINE	3.4	5.92	.57	.3	.11	3.4		KIMBERLITE
S 212	PREMIER MINE	3.4	7.72	.43	.4	.12	3.6		KIMBERLITE
S 213	PREMIER MINE	2.6	14.65	.18	.4	.09	3.5		KIMBERLITE

TABLE 66H.

GALLIUM IN KIMBERLITES FROM SOUTHERN AFRICA. LESOTHO.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LBM100	MATSOKU	7.3	4.10	1.78	.3	.10	1.4		KIMBERLITE
LLT1	LETSENG/LA-TERAE	7.0	4.56	1.52	.4	.14	2.0		KIMBERLITE
KN278	BLOW 144	7.3	4.14	1.75	.4	.13	1.8		KIMBERLITE
KN228	PIPE 200	9.1	5.53	1.64	.4	.14	1.6		KIMBERLITE
AD115	KHABOS DYKE	5.7	4.14	1.37	.4	.13	2.4		KIMBERLITE
AD78	KHUBELU	6.6	4.07	1.61	.4	.14	2.2		KIMBERLITE
KN202	LEMPHANE	6.6	4.53	1.46	.4	.13	2.0		KIMBERLITE
KN275/75	LEMPHANE	3.8	4.54	.84	.4	.12	3.2		KIMBERLITE
2525	HOLOLO	4.2	3.25	1.28	.4	.13	3.1		KIMBERLITE
KN230	DYKE 202	4.2	3.74	1.12	.4	.13	3.0		KIMBERLITE
1982	NQECHANE	.9	12.60	.07	.3	.08	8.7		KIMBERLITE

FOR DETAILED LOCALITIES SEE GURNEY AND EBRAHIM (1973)

TABLE 67A.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
BASALTIC KOMATIITES.
KOMATI FORMATION.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BARBERTON TYPE									
SC 3A	PILLOW MARGIN	10.2	1.81	5.63	.4	.10	1.0	23.9	BASALTIC KOMATIITE
SC 3B	PILLOW INTERMED.	11.4	1.90	6.02	.4	.10	.9	26.2	BASALTIC KOMATIITE
SC 3C	PILLOW INTERIOR	11.3	1.80	6.27	.4	.12	1.0	25.5	BASALTIC KOMATIITE
SC 8A	PILLOW MARGIN	11.0	1.84	5.94	.4	.13	1.2	24.7	BASALTIC KOMATIITE
SC 8B	PILLOW INTERIOR	11.2	1.90	5.89	.4	.14	1.3	22.9	BASALTIC KOMATIITE
SC 11A	PILLOW MARGIN	9.6	1.55	6.17	.4	.10	1.0	27.4	BASALTIC KOMATIITE
SC 11B	PILLOW INTERIOR	11.0	1.78	6.14	.4	.12	1.1	28.6	BASALTIC KOMATIITE
SC 13	PILLOW INTERIOR	11.4	1.95	5.86	.4	.14	1.2	27.7	BASALTIC KOMATIITE
SC 13	OCELLI (PILLOW)	10.8	1.84	5.83	.4	.13	1.2	45.2	BASALTIC KOMATIITE
SC 5A	PILLOW MARGIN	11.7	1.91	6.12	.4	.15	1.3	25.6	BASALTIC KOMATIITE
SC 5B	PILLOW INTERIOR	12.8	2.08	6.17	.4	.15	1.2	25.4	BASALTIC KOMATIITE
SC 5A	LEACHED	10.7	1.80	5.91	.4	.12	1.1	28.0	BASALTIC KOMATIITE
SC 5B	LEACHED	11.6	1.91	6.08	.4	.14	1.2	27.4	BASALTIC KOMATIITE

TABLE 67B.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
BASALTIC KOMATIITES.
KOMATI FORMATION.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BARBERTON TYPE (CONT.)									
SC 2A	PILLOW MARGIN	14.1	2.57	5.49	.4	.13	.9	13.6	BASALTIC KOMATIITE
SC 2B	PILLOW INTERIOR	11.5	1.99	5.76	.4	.10	.9	22.6	BASALTIC KOMATIITE
SC 2A	LEACHED	14.0	2.60	5.36	.4	.15	1.1	15.8	BASALTIC KOMATIITE
SC 2B	LEACHED	11.3	1.99	5.67	.4	.12	1.1	27.0	BASALTIC KOMATIITE
HSS 91	PILLOW INTERIOR	10.0	1.67	5.96	.4	.12	1.2	25.0	BASALTIC KOMATIITE
14J	PILLOW	15.2	2.71	5.60	.4	.11	.7	9.3	BASALTIC KOMATIITE
HSS 25	PILLOW ?	9.3	1.91	4.87	.3	.11	1.1	19.7	BASALTIC KOMATIITE
SD 82	ALONG FLOW CORE	12.0	2.06	5.81	.4	.15	1.2	26.3	BASALTIC KOMATIITE (PILLOWED)
SD 83	ALONG FLOW, CORE	12.2	2.15	5.68	.4	.13	1.0	17.4	BASALTIC KOMATIITE (PILLOWED)
SD 84	ALONG FLOW, CORE	12.8	2.26	5.65	.4	.15	1.2	20.3	BASALTIC KOMATIITE (PILLOWED)
SD 85	ALONG FLOW, CORE	11.9	2.05	5.77	.4	.14	1.2	26.3	BASALTIC KOMATIITE (PILLOWED)
KJ 55		9.4	1.74	5.36	.3	.11	1.1	22.6	BASALTIC KOMATIITE
AB 9		8.4	1.84	4.57	.3	.11	1.3	25.2	BASALTIC KOMATIITE
HSS 20		8.7	2.07	4.21	.3	.11	1.2	21.6	BASALTIC KOMATIITE
HSS 21		9.8	2.08	4.70	.3	.10	1.0	31.5	BASALTIC KOMATIITE
HSS 38		10.3	2.17	4.75	.4	.11	1.1	17.8	BASALTIC KOMATIITE (SHEARED)
HSS 64		10.1	2.22	4.55	.4	.13	1.3	27.0	BASALTIC KOMATIITE
SC 68	MIDDLE OF FLOW	9.7	2.36	4.09	.4	.11	1.2	17.8	BASALTIC KOMATIITE

TABLE 67C.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
BASALTIC KOMATIITES.
KOMATI FORMATION.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BADPLAAS TYPE									
SC 6A	TOP OF FLOW	8.1	2.40	3.38	.3	.11	1.4	13.7	BASALTIC KOMATIITE
SC 6C	BOTTOM OF FLOW	6.9	2.14	3.20	.3	.11	1.7	4.2	BASALTIC KOMATIITE
HSS 6		7.2	1.88	3.85	.3	.10	1.4	24.2	BASALTIC KOMATIITE
KJ 40		8.8	1.90	4.64	.3	.11	1.2	9.6	BASALTIC KOMATIITE
SC 12		6.9	2.06	3.32	.3	.11	1.5	27.8	BASALTIC KOMATIITE
HSS 7		7.8	2.08	3.76	.3	.11	1.4	19.2	BASALTIC KOMATIITE
SD 42C		8.6	2.11	4.05	.3	.11	1.2	30.3	BASALTIC KOMATIITE
R 14		5.1	2.18	2.36	.3	.08	1.5	13.3	BASALTIC KOMATIITE
SD 42A		9.5	2.21	4.31	.3	.11	1.1	14.2	BASALTIC KOMATIITE
VB 2		6.7	2.43	2.75	.4	.11	1.7	14.1	BASALTIC KOMATIITE
HSS 51		10.1	2.34	4.31	.4	.12	1.2	11.5	BASALTIC KOMATIITE
HSS 32		12.7	3.09	4.11	.4	.14	1.1	14.4	BASALTIC KOMATIITE

TABLE 67D.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
BASALTIC KOMATIITES.
KOMATI FORMATION.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
GELUK TYPE								
42J	6.5	1.57	4.12	.3	.07	1.0	19.3	BASALTIC KOMATIITE
KJ 39	5.2	1.60	3.25	.3	.10	1.9	5.1	BASALTIC KOMATIITE
HSS 12	5.2	1.90	2.76	.3	.11	2.0	.4	BASALTIC KOMATIITE
SG 80	7.6	2.08	3.65	.3	.10	1.3	1.1	BASALTIC KOMATIITE
HSS 10	6.8	2.11	3.22	.3	.11	1.6	1.6	BASALTIC KOMATIITE
SG 3	7.9	2.20	3.61	.3	.08	1.0	2.6	BASALTIC KOMATIITE
K 178	4.7	2.33	2.00	.3	.10	2.1	1.3	BASALTIC KOMATIITE
HSS 54	8.3	2.62	3.18	.3	.11	1.3	.7	BASALTIC KOMATIITE
HSS 9	6.8	2.74	2.47	.3	.11	1.6	2.9	BASALTIC KOMATIITE

TABLE 67E.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
BASALTIC KOMATIITES.
THEESPRUIT AND KROMBERG FORMATIONS AND UNKNOWN TYPES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
THEESPRUIT FORMATION								
BARBERTON TYPE								
TS 1	9.9	1.57	6.26	.4	.12	1.2	30.7	BASALTIC KOMATIITE
AB 21	12.2	2.56	4.77	.4	.14	1.2	15.3	BASALTIC KOMATIITE NEAR CONTACT
BADPLAAS TYPE								
HSS 148	4.8	2.48	1.94	.3	.11	2.2	9.6	BASALTIC KOMATIITE
KROMBERG FORMATION								
BADPLAAS TYPE								
M 57	9.5	2.88	3.28	.4	.11	1.2	14.0	BASALTIC KOMATIITE
UNKNOWN FORMATION AND UNKNOWN TYPE								
KJ 66	5.3		N.A.	.3	.11	2.0		BASALTIC KOMATIITE
K 135	10.6		N.A.	.4	.14	1.3		BASALTIC KOMATIITE
K 82	10.9		N.A.	.4	.13	1.2		BASALTIC KOMATIITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 67F.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
PERIDOTITIC KOMATIITES.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
KOMATI FORMATION									
HSS 95		4.7	1.92	2.43	.3	.10	2.1	5.9	PERIDOTITIC KOMATIITE
HSS 1		4.0	2.20	1.79	.3	.08	2.1	.8	PERIDOTITIC KOMATIITE
HSS 13	FLOW	2.7	2.31	1.19	.3	.08	3.1	1.2	PERIDOTITIC KOMATIITE
HSS 15		3.8	2.32	1.63	.3	.09	2.4	1.5	PERIDOTITIC KOMATIITE
HSS 87		4.1	2.35	1.73	.3	.10	2.4	1.8	PERIDOTITIC KOMATIITE
R 13		3.4	2.37	1.41	.3	.07	1.9	.3	PERIDOTITIC KOMATIITE(SERPENTINISED)
VU 25		4.2	2.38	1.76	.3	.10	2.4	2.9	PERIDOTITIC KOMATIITE
VU 32		2.5	2.40	1.04	.3	.09	3.7	.4	PERIDOTITIC KOMATIITE
VU 30A		2.9	2.41	1.21	.3	.05	1.8	.8	PERIDOTITIC KOMATIITE
AU 5	PILLOW	4.4	2.43	1.82	.3	.07	1.6	1.3	PERIDOTITIC KOMATIITE
HSS 28		3.3	2.47	1.33	.3	.09	2.8	.3	PERIDOTITIC KOMATIITE
HSS 33		4.5	2.50	1.80	.3	.09	2.0	.7	PERIDOTITIC KOMATIITE
53J		3.7	2.53	1.44	.3	.09	2.5	2.6	PERIDOTITIC KOMATIITE (DYKE)
HSS 8	BASE OF FLOW	2.8	2.57	1.08	.3	.09	3.3	.9	PERIDOTITIC KOMATIITE
V 2		3.1	2.76	1.12	.3	.09	3.0	1.6	PERIDOTITIC KOMATIITE
52J		3.3	2.91	1.13	.3	.09	2.8	1.3	PERIDOTITIC KOMATIITE (DYKE)
HSS 27		5.9	3.32	1.76	.3	.10	1.7	.8	PERIDOTITIC KOMATIITE
HSS 88A	TOP OF FLOW	5.3	2.28	2.32	.3	.10	1.9	1.5	PERIDOTITIC KOMATIITE (SPINIFEX)
HSS 88B	BASE OF FLOW	4.1	2.29	1.80	.3	.09	2.2	.7	PERIDOTITIC KOMATIITE
HSS 89	TOP OF FLOW	5.2	2.33	2.23	.3	.10	1.9	1.8	PERIDOTITIC KOMATIITE (SPINIFEX)

TABLE 67G.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
PERIDOTITIC KOMATIITES.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
KOMATI FORMATION (CONT.)									
SAMPLES FROM TWO FLOWS									
BASE OF UPPER FLOW									
HSS-530	CHILL MARGIN	4.6	2.36	1.94	.3	.09	2.0	1.1	PERIDOTITIC KOMATIITE
LOWER FLOW									
HSS-531	TOP OF FLOW	4.7	2.26	2.10	.3	.09	1.9	1.7	PERIDOTITIC KOMATIITE (SPINIFEX)
HSS-532		4.7	2.24	2.10	.3	.09	2.0	1.8	PERIDOTITIC KOMATIITE (SPINIFEX)
HSS-533		5.2	2.41	2.16	.3	.09	1.8	2.0	PERIDOTITIC KOMATIITE (SPINIFEX)
HSS-534		4.5	2.39	1.87	.3	.08	1.9	1.0	PERIDOTITIC KOMATIITE
HSS-535		4.2	2.26	1.85	.3	.08	2.0	.9	PERIDOTITIC KOMATIITE
HSS-536	BASE OF FLOW	3.9	2.42	1.60	.3	.09	2.4	.7	PERIDOTITIC KOMATIITE

TABLE 67H.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
PERIDOTITIC KOMATIITES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
SANDSPRUIT FORMATION								
HSS 105	3.3	2.06	1.61	.3	.09	2.8	.5	PERIDOTITIC KOMATIITE
HSS 112	3.2	2.18	1.48	.3	.09	2.8		PERIDOTITIC KOMATIITE
HSS 109	3.4	2.29	1.48	.3	.09	2.7	.7	PERIDOTITIC KOMATIITE (SPINIFEX)
HSS 107	3.5	2.42	1.44	.3	.09	2.6	.1	PERIDOTITIC KOMATIITE
HSS 131	4.1	2.54	1.62	.3	.09	2.2	.1	PERIDOTITIC KOMATIITE
VU 33	4.8	2.63	1.80	.3	.10	2.1	5.1	PERIDOTITIC KOMATIITE
HSS 130	4.4	2.80	1.58	.3	.10	2.2	.1	PERIDOTITIC KOMATIITE
87J	6.4	3.22	1.98	.3	.11	1.7	5.1	PERIDOTITIC KOMATIITE
88J	5.4	3.80	1.41	.3	.10	1.9	3.9	PERIDOTITIC KOMATIITE
THEESPRUIT FORMATION								
HSS 150	3.5	2.37	1.48	.3	.10	2.8	.1	PERIDOTITIC KOMATIITE
UNKNOWN FORMATION								
V 38	1.4		N.A.	.3	.07	4.7		PERIDOTITIC KOMATIITE
KJ 51	1.6		N.A.	.3	.10	6.4		PERIDOTITIC KOMATIITE
AU 21	2.1		N.A.	.3	.10	4.7		PERIDOTITIC KOMATIITE
KJ 52	2.3		N.A.	.3	.10	4.3		PERIDOTITIC KOMATIITE
K 146	4.8		N.A.	.3	.10	2.1		PERIDOTITIC KOMATIITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 67I.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
OTHER THAN KOMATIITES.
LOWER ULTRAMAFIC UNIT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
SANDSPRUIT FORMATION								
86J	2.2	2.39	.90	.3	.08	3.6	1.4	SERPENTINITE
THEESPRUIT FORMATION								
AT 2	28.5	2.05	13.90	.5	.19	.7		FELSIC TUFF
KOMATI FORMATION								
R 16	1.0	1.87	.51	.3	.08	8.2	.2	SERPENTINITE
HSS 2	11.2	1.64	6.80	.4	.13	1.2	30.7	METABASALT
HSS 43	12.1	1.44	8.39	.4	.13	1.1	14.4	METATHOLEIITE
HSS 23	10.0	1.46	6.83	.3	.11	1.1	27.9	METATHOLEIITE
HSS 56	12.2	1.51	8.02	.4	.13	1.1	18.2	METATHOLEIITE
HSS 58	12.3	1.58	7.77	.4	.13	1.1	24.4	METATHOLEIITE (PILLOWED)
HSS 34	9.9	1.99	4.96	.3	.10	1.0	25.6	METATHOLEIITE
SC 9	14.2	2.02	7.02	.5	.16	1.1	11.7	METATHOLEIITE
HSS 52B	15.1	2.38	6.32	.4	.16	1.0	59.5	HIGH-K ANDESITE
VP 5	16.1	2.08	7.73	.5	.19	1.2		FELDSPAR PORPHYRY

TABLE 67J.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND. OTHER THAN KOMATIITES. HOOGENOEG FORMATION.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LV 7		12.1	1.49	8.11	.4	.14	1.2	30.4	METABASALT
LV 5		10.9	1.51	7.21	.4	.12	1.1		METABASALT
V 36		11.2	1.51	7.46	.4	.11	1.0	24.7	METABASALT
M 390		12.3	1.61	7.65	.4	.14	1.1	20.8	METABASALT
LV 4		12.2	1.64	7.41	.4	.14	1.2	32.0	METABASALT
77J		13.1	1.78	7.36	.4	.14	1.1		METABASALT
LV 6		14.7	2.91	5.04	.5	.18	1.3	20.6	METABASALT
V36 A		7.2		N.A.	.3	.09	1.3		METABASALT
V 15		13.6		N.A.	.5	.18	1.4		METABASALT
V 16	PILLOW	12.9	1.60	8.07	.4	.09	.7	20.2	METATHOLEIITE
40J		12.6	1.64	7.71	.4	.10	.8	16.9	METATHOLEIITE
34J	PILLOW	12.8	1.70	7.52	.4	.10	.8	34.5	METATHOLEIITE
V 13	CARBONATED PILLOW	16.4	2.22	7.40	.6	.21	1.3	35.9	METATHOLEIITE
E 26		20.7	2.76	7.51	.8	.28	1.4	48.2	INTERMEDIATE LAVA (PILLOWED)
LV 10		11.0	1.80	6.12	.4	.13	1.2		ACID LAVA
19J		15.1	1.95	7.71	.4	.11	.7		ACID PYROCLAST
20J		1.9	1.46	1.29	.2	.08	4.1	.3	SERPENTINITE
V 31		8.3	2.92	2.83	.3	.11	1.3		WEBSTERITE (AMPHIBOLITISED)

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 67K.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
OTHER THAN KOMATIITES.
KROMBERG AND UNKNOWN FORMATIONS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
KROMBERG FORMATION								
VB 17	8.4	2.19	3.82	.3	.11	1.3		ULTRAMAFIC LAVA
VB 19	15.6	2.17	7.20	.6	.14	.9	28.1	METABASALT
21J	16.3	2.39	6.81	.6	.22	1.3	29.8	METABASALT
LV 9	18.3	2.50	7.31	.6	.21	1.1	35.8	METABASALT
VA 6A	23.9	2.35	10.16	.6	.21	.9	71.4	ACID LAVA (PILLOWED)
UNKNOWN FORMATION								
KR 23	1.3		N.A.	.3	.10	7.6		PYROXENITE
UDI	3.8	1.55	2.42	.3	.08	2.3	.6	SERPENTINISED PERIDOTITE DYKE
HSS 36	13.7	1.52	8.97	.5	.16	1.2	41.7	DOLERITE DYKE, POST-BARBERTON AGE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 67L.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND.
GRANITIC INTRUSIVES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
MPAGENI PLUTON 2250 - 2810 MY								
AA3	12.5		N.A.	.4	.15	1.2		GRANITE
HOOD GRANITE 3070 MY								
VG 11	16.6		N.A.	.5	.20	1.2		GRANITE
VG 12	16.6	2.13	7.78	.6	.21	1.2		GRANITE
SALISBURY KOP PLUTON 3060 MY								
H 49	17.8		N.A.	.6	.21	1.2		GRANITE
H 80	14.6		N.A.	.4	.16	1.1		GRANITE
DALMEIN PLUTON 3250 MY								
VD 19	15.8	1.98	7.96	.4	.16	1.0		GRANITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 67M.

GALLIUM IN ROCKS FROM THE BARBERTON MOUNTAIN LAND. GRANITIC INTRUSIVES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NELSHOOGTE PLUTON 3220 MY								
V 17	15.9	2.02	7.84	.5	.19	1.2		LEUCO BIOTITE TRONDHJEMITE
STOLZBURG PLUTON								
VG 15	15.5		N.A.	.6	.20	1.3		LEUCO BIOTITE TRONDHJEMITE
3J	17.0	2.10	8.11	.5	.19	1.1		LEUCO BIOTITE TRONDHJEMITE
THEESPRUIT PLUTON 3250 MY								
VG 18A	16.4	2.11	7.77	.5	.19	1.2		LEUCO BIOTITE TRONDHJEMITE
KAAP VALLEY GRANITE 3310 MY								
KV 1	16.5	1.97	8.37	.6	.21	1.3		HORNBLENDE TONALITE
V 41	15.2		N.A.	.6	.21	1.4		HORNBLENDE TONALITE
NELSPRUIT MIGMATITE 2992 - 3160 MY								
EE 1	16.8	2.11	7.98	.6	.21	1.2		MIGMATITE
EE 3	16.1		N.A.	.6	.21	1.3		MIGMATITE
EE 5	15.1	1.90	7.91	.5	.20	1.3		MIGMATITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 68.

GALLIUM IN ROCKS FROM GREENLAND AND CALIFORNIA, U.S.A.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
GREENLAND								
E.G. 7152	20.2		N.A.	.7	.25	1.2		BASALT
E.G. 7033	20.3		N.A.	.7	.25	1.2		BASALT
E.G. 7138	20.8		N.A.	.7	.25	1.2		BASALT
E.G. 7117	21.5		N.A.	.7	.24	1.1		BASALT
CALIFORNIA								
CAL 1	13.7		N.A.	.4	.16	1.1		HIGH-AL BASALT
CAL 2	15.1		N.A.	.4	.16	1.0		HIGH-AL BASALT

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 69.

GALLIUM IN ROCKS FROM TASMANIA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CHILLED MARGINS								
M 172	14.1		N.A.	.5	.20	1.4		DOLERITE
M 200	14.4		N.A.	.6	.20	1.4		DOLERITE
LOWER ZONE DOLERITES								
DDH 5123 - 1000 FT.	11.2		N.A.	.4	.15	1.3		DOLERITE
DDH 5123 - 1200 FT.	11.3		N.A.	.4	.15	1.3		DOLERITE
CENTRAL ZONE QUARTZ DOLERITES								
M 210	17.8		N.A.	.6	.22	1.2		QUARTZ DOLERITE
M 395	17.9		N.A.	.7	.24	1.3		QUARTZ DOLERITE
M 221	18.0		N.A.	.6	.22	1.2		QUARTZ DOLERITE
M 162	16.2		N.A.	.6	.20	1.2		GRANOPHYRE
M 19	17.7		N.A.	.6	.23	1.3		GRANOPHYRE
M 223	18.7		N.A.	.6	.23	1.2		FAYALITE GRANOPHYRE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 70.

GALLIUM IN ROCKS FROM ANTARCTICA (QUEEN MAUD LAND).

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
BORG DOLERITES								
ANT 1	13.0		N.A.	.4	.15	1.1		THOLEIITE
ANT 4	13.8		N.A.	.4	.15	1.1		THOLEIITE
ANT 7	14.1		N.A.	.4	.15	1.1		THOLEIITE
ANT 10	14.1		N.A.	.4	.15	1.1		THOLEIITE
ANT 5	15.8		N.A.	.4	.16	1.0		THOLEIITE
ANT 6	16.4		N.A.	.6	.20	1.2		THOLEIITE
ANT 2	20.1		N.A.	.5	.18	.9		THOLEIITE
BASALTIC DYKES								
ANT 9	13.3		N.A.	.4	.16	1.2		THOLEIITE
ANT 8	14.5		N.A.	.4	.16	1.1		THOLEIITE
ANT 3	19.1		N.A.	.6	.22	1.2		THOLEIITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 71.

GALLIUM IN A PRECAMBRIAN DOLERITE DYKE CUTTING THE PREMIER KIMBERLITE PIPE.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
PREMIER 1	11.3		N.A.	.4	.16	1.4		DOLERITE
PREMIER 5	11.5		N.A.	.4	.15	1.3		DOLERITE
PREMIER 6	15.1		N.A.	.4	.16	1.0		DOLERITE
PREMIER 2	15.9		N.A.	.4	.16	1.0		DOLERITE
PREMIER 3	16.1		N.A.	.4	.16	1.0		DOLERITE
PREMIER 4	16.3		N.A.	.4	.16	1.0		DOLERITE
PREMIER ACID	15.3		N.A.	.4	.16	1.0		DOLERITE
PREMIER BASAL	12.0		N.A.	.4	.16	1.3		DOLERITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 72.

GALLIUM IN UMKONDO DOLERITES, RHODESIA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
UMKONDO J.DY 4A	20.4	2.77	7.37	.5	.17	.8	22.1	DOLERITE DYKE (FEEDER TO LAVAS ?)
UMKONDO A	15.8	2.04	7.76	.4	.15	.9	36.1	DOLERITE
UMKONDO C	15.0	1.90	7.89	.4	.16	1.1	24.0	DOLERITE
UMKONDO E	16.6	2.18	7.62	.4	.16	1.0	29.5	DOLERITE
UMKONDO F	15.9	2.12	7.52	.4	.16	1.0	29.6	DOLERITE
UMKONDO G	15.4	1.80	8.52	.4	.16	1.0	27.2	DOLERITE
UMKONDO H	15.4	2.02	7.62	.4	.16	1.0	29.8	DOLERITE
UMKONDO I	17.2	2.20	7.83	.4	.16	.9	31.3	DOLERITE
UMKONDO J	12.7	1.68	7.57	.4	.15	1.2	18.2	DOLERITE
UMKONDO K	15.3	1.98	7.73	.4	.16	1.0	27.8	DOLERITE
UMKONDO L	13.9	1.73	8.04	.4	.15	1.1	19.9	DOLERITE
UMKONDO M	15.5	1.99	7.78	.4	.16	1.0	25.2	DOLERITE
UMKONDO N	15.4	2.03	7.57	.4	.16	1.0	30.2	DOLERITE
UMKONDO O	14.6	1.80	8.10	.4	.16	1.1	24.8	DOLERITE
UMKONDO P	14.9	1.90	7.83	.4	.16	1.0	25.6	DOLERITE
UMKONDO A 1A	15.7	2.04	7.71	.4	.15	.9	43.6	DOLERITE
UMKONDO A 2A	15.3	1.96	7.82	.4	.16	1.0	36.0	DOLERITE
UMKONDO A 3A	16.1	1.99	8.07	.4	.15	.9	42.2	DOLERITE
UMKONDO A 4A	16.1	2.03	7.95	.4	.15	.9	32.0	DOLERITE
UMKONDO UJ	11.9		N.A.	.4	.14	1.2		DOLERITE
UMKONDO J.DY 3A	15.2		N.A.	.4	.16	1.0		DOLERITE
UMKONDO B 4A	16.7		N.A.	.4	.16	.9		DOLERITE

*** N.A. = AL203 NOT KNOWN ***

TABLE 73A.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, CENTRAL AREA, SOUTH AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
SPITSKOPVLEI AREA, CAPE									
D/S 88	MAIN DYKE	18.0	2.39	7.52	.6	.23	1.3	27.3	DOLERITE, TOP
D/S 93	MAIN DYKE	17.6	2.28	7.71	.6	.23	1.3	27.0	DOLERITE
D/S 104	MAIN DYKE	17.8	2.32	7.68	.7	.23	1.3	27.0	DOLERITE
D/S 106	MAIN DYKE	18.0	2.35	7.66	.6	.23	1.3	27.8	DOLERITE, BASE
D/S 95	CHILL PHASE	19.7	2.53	7.75	.6	.23	1.2	26.2	DOLERITE
D/S 35	X-CUTTING DYKE	17.3	2.27	7.61	.6	.23	1.3	31.2	DOLERITE
D/S 73	X-CUTTING DYKE	15.4	1.88	8.19	.6	.21	1.3	23.6	DOLERITE
D/S 50	INCLINED SHEET	15.9	1.92	8.27	.6	.21	1.3	25.3	DOLERITE
STORMBERG BASALTS									
KL 25		15.4	1.89	8.12	.5	.19	1.2	42.4	PLAGIOCLASE PHYRIC BASALT, ALTERED
KL 24		15.5	1.89	8.19	.6	.21	1.3	41.8	PLAGIOCLASE PHYRIC BASALT, ALTERED
KL 38		16.8	2.00	8.39	.6	.21	1.3	28.4	BASALT
KL 27		17.4	2.09	8.32	.6	.22	1.3	29.4	BASALT
KL 37	FEEDER DYKE	17.1	2.05	8.34	.6	.22	1.3	28.5	DOLERITE

TABLE 738.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, CENTRAL AREA, SOUTH AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
DIVERSE LOCALITIES									
6641	ELEPHANTS HEAD, CP	6.3	2.08	3.03	.3	.11	1.8	6.7	PICRITE
6626	MT. ARTHUR COMPLEX	12.6	1.66	7.55	.4	.16	1.2	17.3	DOLERITE
6624	MT. ARTHUR COMPLEX	15.5	1.93	8.02	.6	.21	1.3	22.9	DOLERITE(CHILL PHASE)
6686	MT. PROSPECT, CP	13.2	1.56	8.44	.4	.16	1.2	23.7	DOLERITE
KL 3	ERMELO, TVL.	14.7	1.84	7.99	.6	.20	1.3	25.3	DOLERITE
6372	JAGERSFONTEIN, OFS	15.1	1.66	9.09	.6	.21	1.4	21.8	DOLÉRITE
KL 33	VICTORIA WEST, CP	15.2	1.55	9.80	.6	.21	1.3	23.2	DOLERITE
KL 32	FRASERBURG, CP	15.8	2.02	7.78	.6	.21	1.3	23.1	DOLERITE
2	VRYHEID, NATAL	16.1	1.94	8.30	.6	.21	1.3	23.9	DOLERITE
KL 5	EDENVILLE, OFS	16.2	1.99	8.14	.6	.23	1.4	24.7	DOLERITE
6644	ELEPHANTS HEAD, CP	16.3	1.97	8.26	.6	.23	1.4	22.9	DOLERITE
6684	MURRAYSBURG, CP	17.0	2.09	8.11	.6	.22	1.3	30.7	DOLERITE
KL 10	SUTHERLAND, CP	19.3	2.63	7.34	.7	.24	1.2	27.5	DOLERITE

TABLE 73C.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, SOUTHERN LEBOMBO - SWAZILAND AREA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LEBOMBO BASALTS								
KL 2	21.0		N.A.	.7	.25	1.2		DOLERITE
KLL 11	19.2	2.49	7.68	.7	.24	1.3	23.4	PLAGIOCLASE PHYRIC BASALT
KLL 13	21.3	2.33	9.16	.8	.29	1.4	27.9	PLAGIOCLASE PHYRIC BASALT
LB 3	17.1		N.A.	.6	.22	1.3		BASALT
KLL 12	17.8	2.12	8.38	.6	.21	1.2	31.9	BASALT
LB 2	23.8		N.A.	.7	.24	1.0		BASALT
LEBOMBO ACID VOLCANICS								
SR 4	22.4		N.A.	.5	.19	.9		RHYODACITE
SR 1	23.1		N.A.	.5	.19	.8		RHYODACITE
KLL 14	23.5	3.50	6.71	.5	.19	.8	82.2	RHYOLITE
KLL 15	24.0	3.61	6.63	.6	.21	.9	65.4	PITCHSTONE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 73D.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, NORTHERN AREA. RHODESIA AND BOTSWANA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
WANKIE								
KL 23	18.9	2.60	7.26	.6	.21	1.1	22.6	BASALT
KLR 17	20.2	2.77	7.30	.6	.22	1.1	25.5	BASALT
KLR 13	22.6	3.28	6.87	.7	.25	1.1	28.7	BASALT
KLR 4	26.7	3.84	6.93	.7	.25	1.0	35.7	BASALT
KLR 16	27.9	4.20	6.64	.7	.25	.9	38.3	BASALT
NYAMANDHLOVU								
KLR 12	23.1	3.36	6.88	.7	.25	1.1	29.4	BASALT
KLR 9	23.2	3.39	6.84	.7	.25	1.1	30.5	BASALT
KLR 10	26.5	3.66	7.23	.6	.24	.9	38.3	BASALT
FEATHERSTONE								
KLR 14	16.6	3.39	4.90	.6	.21	1.2	28.8	BASALT
KLR 15	19.0	3.39	5.58	.6	.23	1.2	34.8	BASALT
KLR 11	21.5	3.20	6.73	.6	.22	1.0	30.0	BASALT

TABLE 73E.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, NORTHERN AREA. RHODESIA AND BOTSWANA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
TULI								
KLR 2	24.0	3.45	6.93	.7	.25	1.1	29.8	BASALT
BOTSWANA								
KLB 1	22.8	3.20	7.10	.7	.25	1.1	29.5	DOLERITE
KLB 2	29.0	4.39	6.59	.9	.32	1.1	43.8	CHILLED BASALT

TABLE 73F.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, NUANETSI IGNEOUS PROVINCE, RHODESIA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
N 60	12.8	3.94	3.23	.5	.16	1.3	20.1	ALKALINE PICRITE
NB 7	15.0	3.48	4.30	.4	.16	1.0	30.7	LIMBURGITE
N 26	15.3	3.46	4.42	.5	.16	1.1	28.1	LIMBURGITE
N 113	16.3	3.39	4.79	.4	.16	1.0	19.7	OLIVINE BASALT
N 405	17.6	3.44	5.11	.5	.17	1.0	22.7	OLIVINE BASALT
N 335	13.6	3.36	4.05	.5	.16	1.2	27.5	OLIVINE BASALT
N 340	14.8	2.07	7.14	.5	.16	1.1	22.9	BASALT
N 243	21.0	2.96	7.09	.6	.23	1.1	36.7	BASALT
N 497	21.5	2.92	7.36	.7	.25	1.2	25.1	BASALT
NB 3	22.9	3.17	7.23	.7	.24	1.0	44.2	BASALT
N 285	25.0	3.12	7.99	.9	.31	1.2	42.6	BASALT
NR 7	17.4	2.72	6.38	.5	.18	1.1	77.3	RHYOLITE
NR 1	19.8	2.97	6.67	.6	.24	1.2	84.9	RHYOLITE

TABLE 73G.

GALLIUM IN KARROO-STORMBERG VOLCANIC ROCKS, SOUTH WEST AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
SOUTHERN SOUTH WEST AFRICA								
KLS 1	15.9	2.00	7.93	.6	.20	1.2	23.0	BASALT
KL 11	14.6	1.73	8.45	.4	.16	1.1	24.5	DOLERITE
KL 12	15.3	1.90	8.05	.4	.11	.7	24.9	DOLERITE
KLS 7	16.2	1.87	8.64	.6	.21	1.3	22.3	DOLERITE
NORTHERN SOUTH WEST AFRICA								
KLS 20	16.0	2.21	7.26	.5	.20	1.2	36.5	DOLERITE
KL 19	17.7	2.44	7.25	.6	.21	1.2	39.3	BASALT
KL 18	16.7	2.26	7.39	.5	.16	1.0	35.7	BASALT
KL 17	18.7	2.63	7.10	.6	.21	1.1	28.4	BASALT
KL 16	19.1	2.62	7.28	.6	.21	1.1	35.7	BASALT
KL 15	18.1	2.46	7.32	.6	.21	1.2	34.5	BASALT
KL 14	16.3	2.25	7.23	.4	.16	1.0	45.3	BASALT
KLS 19	20.7	2.87	7.21	.6	.24	1.2	40.1	BASALT
KLS 16	19.1	2.73	7.00	.6	.21	1.1	38.6	DOLERITE
KLS 24	18.3	2.37	7.71	.6	.21	1.2	25.8	BASALT
KLS 22	19.4	2.67	7.25	.6	.21	1.1	34.8	BASALT
KL 13	15.0	2.23	6.71	.4	.13	.9	80.8	RHYOLITE
KL 20	16.0	2.34	6.84	.6	.21	1.3	73.2	RHYOLITE

TABLE 74.

GALLIUM IN BRAZILIAN (PARANA) VOLCANIC ROCKS.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NORTHERN								
BRA 1	20.7	3.01	6.86	.6	.23	1.1	29.2	BASALT
BRA 2	23.2	3.38	6.86	.6	.23	1.0	29.6	BASALT
BRA 3	20.4	2.99	6.82	.7	.25	1.2	28.7	BASALT
BRA 4	22.6	3.42	6.60	.7	.25	1.1	31.9	BASALT
BRA 5	22.8	3.38	6.74	.7	.25	1.1	33.8	BASALT
BRA 6	22.5	3.33	6.76	.7	.25	1.1	35.8	BASALT
BRA 16	24.7	3.49	7.05	.7	.25	1.0	38.9	BASALT
BRA 9	19.3	2.67	7.21	.6	.23	1.2	27.4	DOLERITE
SOUTHERN								
BRA 17	19.2	2.61	7.35	.6	.22	1.1	28.0	BASALT
BRA 18	19.0	2.54	7.47	.6	.21	1.1	29.1	BASALT
BRA 13	19.2	2.43	7.89	.6	.22	1.1	44.0	DOLERITE
BRA 14	18.9	2.47	7.64	.6	.21	1.1	33.8	DOLERITE
BRA 11	16.1	2.39	6.73	.5	.18	1.1	78.6	RHYOLITE
BRA 12	16.8	2.46	6.81	.5	.19	1.1	73.9	RHYOLITE

Note: The Ga content of BRA 2 is probably slightly high due to interference from Ta (see Fig. 5 and Table 3).

TABLE 75

SUMMARY OF MEAN Ga AND Ga/Al VALUES FOR CONTINENTAL DOLERITES AND BASALTS

Locality	Dolerite		Basalt		Age m.y.
	Ga ppm	Ga/Al x 10000	Ga ppm	Ga/Al x 10000	
Precambrian rocks					
Anarctica	15.3	-	-	-	
Premier	14.2	-	-	-	~1100
Umkondo	15.4	2.0	-	-	~1100
Karroo rocks					
Spitskopvlei	17.2	2.2	-	-	150-190
Stormberg	17.1	2.1	17.1	2.0	
Central area	15.6	1.9	-	-	
Southern Lebombo	21.0	-	19.6	2.1	
Southern S.W.A.	15.4	1.8	15.9	2.0	160-180
Northern S.W.A.	17.6	2.5	18.3	2.5	110-130
Wankie	-	-	23.3	3.3	170-200
Nyamandhlovu	-	-	24.3	3.5	
Featherstone	-	-	19.0	3.3	
Tuli	-	-	24.0	3.5	
Nuanetsi	-	-	22.6	3.0	
Botswana	22.8	3.2	29.0	4.4	
Brazil (Parana)					
Southern	19.1	2.5	19.1	2.6	120-130
Northern	19.3	2.7	22.4	3.3	
Others					
Greenland	-	-	20.7	-	
Tasmania	15.0	-	-	-	
Barberton Mountain Land					
Komati and Hoogenoeg Formations	-	-	12.2	1.7	>3400
Kromberg Formation	-	-	16.7	2.4	
Nockolds and Allen (1956)					
Karroo dolerites, South Africa					
Main Trend	24.0	3.0			
Iron-rich Trend	27.0	3.5			
Mt. Arthur tholeiite	23.0	3.0			

TABLE 76A.

GALLIUM IN ROCKS AND SEPARATED MINERALS FROM WEATHERED, PARTLY WEATHERED AND FRESH GRANITES FROM THE CAPE PENINSULA.
SITES: K = KLOOF NEK, S = SANDY COVE, M = MILLER'S POINT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
1KF ROCK	18.4	2.51	7.30	.6	.21	1.2	67.9	FRESH GRANITE
1KI ROCK	19.9	2.16	9.20	.6	.21	1.1	69.0	PARTLY WEATHERED GRANITE
1KW ROCK	21.8	2.53	8.62	.6	.21	1.0	48.4	WEATHERED GRANITE
1SF ROCK	18.7	2.43	7.67	.6	.21	1.1	74.9	FRESH GRANITE
2SI ROCK	20.0	2.58	7.73	.6	.21	1.1	64.3	PARTLY WEATHERED GRANITE
1SW ROCK	21.5	2.38	9.05	.6	.21	1.0	37.6	WEATHERED GRANITE
1MF ROCK	16.6	2.06	8.06	.6	.21	1.2	92.5	FRESH GRANITE
1MI ROCK	18.1	2.22	8.14	.6	.21	1.1	62.5	PARTLY WEATHERED GRANITE
1MW ROCK	22.4	2.66	8.41	.6	.21	.9	53.2	WEATHERED GRANITE

*** D.I. IN THIS TABLE IS THE INDEX OF WEATHERING (PARKER,1970) ***

TABLE 76B.

GALLIUM IN ROCKS AND SEPARATED MINERALS FROM WEATHERED, PARTLY WEATHERED AND FRESH GRANITES FROM THE CAPE PENINSULA.
SITES: K = KLOOF NEK, S = SANDY COVE, M = MILLER'S POINT.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
1KF BIOTITE	58.3	5.95	9.79	1.0	.39	.7		FRESH GRANITE
1KI BIOTITE	61.4	6.22	9.86	1.0	.40	.6		PARTLY WEATHERED GRANITE
1KW BIOTITE	60.3	5.96	10.10	.9	.38	.6		WEATHERED GRANITE
1SF BIOTITE	65.5	6.63	9.88	1.0	.41	.6		FRESH GRANITE
2SI BIOTITE	58.3	5.49	10.62	.9	.37	.6		PARTLY WEATHERED GRANITE
1SW BIOTITE	57.0	5.49	10.38	.9	.36	.6		WEATHERED GRANITE
1MF BIOTITE	66.0	6.65	9.92	1.0	.41	.6		FRESH GRANITE
1MI BIOTITE	57.0	5.67	10.05	.9	.38	.7		PARTLY WEATHERED GRANITE
1MW BIOTITE	58.2	5.73	10.16	.9	.38	.7		WEATHERED GRANITE
1KF FELSPAR	15.0	1.50	9.98	.4	.16	1.0		FRESH GRANITE
1KI FELSPAR	13.5	1.50	8.98	.4	.16	1.2		PARTLY WEATHERED GRANITE
1KW FELSPAR	16.0	1.60	9.96	.5	.17	1.1		WEATHERED GRANITE
1SF FELSPAR	13.5	1.50	8.99	.5	.19	1.4		FRESH GRANITE
2SI FELSPAR	16.0	1.62	9.82	.6	.21	1.3		PARTLY WEATHERED GRANITE
1SW FELSPAR	17.5	1.67	10.50	.6	.21	1.2		WEATHERED GRANITE
1MF FELSPAR	13.0	1.42	9.18	.4	.16	1.2		FRESH GRANITE
1MI FELSPAR	14.0	1.47	9.49	.4	.16	1.2		PARTLY WEATHERED GRANITE
1MW FELSPAR	15.4	1.60	9.63	.5	.16	1.1		WEATHERED GRANITE

TABLE 77

DATA FROM MESONORM CALCULATIONS ON GRANITES AND ASSOCIATED FELDSPARS FROM FRESH, PARTLY WEATHERED AND WEATHERED GRANITES FROM THE CAPE PENINSULA

Sample	Quartz %	Orthoclase %	Albite %	Anorthite %	Biotite %	Corundum %	Ga ppm
KF rock	36	24	23	3	8	4	18.4
KI rock	34	37	12	0	6	10	19.9
KW rock	46	28	4	0	8	12	21.8
SF rock	31	26	26	4	8	3	18.7
SI rock	40	34	9	0	8	7	20.0
SW rock	52	17	6	0	8	15	21.5
MF rock	21	41	27	2	5	2	16.6
MI rock	39	33	11	0	7	8	18.1
MW rock	45	31	4	0	8	11	22.4
Feldspars							
KF	6	60(64)	30(32)	2	0	1	15.0(16.0)
KI	13	62(71)	23(26)	0	0	2	13.5(15.5)
KW	7	82(88)	9(10)	0	0	3	16.0(17.2)
SF	13	51(59)	31(36)	3	0	1	13.5(15.5)
SI	8	73(79)	16(17)	0	1	3	16.0(17.4)
SW	11	78(88)	4(5)	0	1	6	17.5(19.7)
MF	11	58(65)	29(33)	1	0	1	13.0(14.6)
MI	10	72(81)	14(16)	0	0	2	14.0(15.6)
MW	7	84(90)	6(7)	0	0	3	15.4(16.6)

Figures in brackets for feldspars are values calculated on a quartz-free basis. F = fresh. I = partly weathered. W = weathered. Sample names and sites as in Table 76.

TABLE 78A.

****
* GALLIUM IN MALMESBURY SHALES, *
* CAPE PROVINCE, SOUTH AFRICA. *
****

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
RC3	25.4	2.57	9.88	.5	.18	.7	83.5	ARGILLACEOUS SHALE (FRESH)
ML5	22.5	2.43	9.24	.5	.18	.8	60.7	ARGILLACEOUS SHALE (FAIRLY FRESH)
ML1	21.9	2.41	9.09	.5	.18	.8	43.8	ARGILLACEOUS SHALE (VERY WEATHERED)
ML3	16.5	2.21	7.46	.4	.16	.9	32.3	ARGILLACEOUS SHALE (VERY WEATHERED)
ML4	26.7	1.88	14.21	.4	.17	.6	24.2	CLAY FROM SURFACE OF ML5
ML6	12.6	2.19	5.74	.4	.16	1.2	54.9	ARENACEOUS GREYWACKE (FRESH)
ML7	12.5	2.22	5.62	.4	.15	1.2	32.6	B ZONE SOIL, ARENACEOUS TYPE
ML11	23.4	2.49	9.40	.5	.18	.8	63.2	ARGILLACEOUS SHALE (FRESH)
ML10	22.2	2.57	8.63	.5	.18	.8	57.8	ARGILLACEOUS SHALE (WEATHERED)
ML13	32.5	2.64	12.32	.5	.20	.6	58.9	ARGILLACEOUS SHALE (WEATHERED)
ML12	11.8	2.12	5.56	.4	.15	1.3	52.5	ARENACEOUS GREYWACKE (FRESH)
ML15	24.9	2.46	10.10	.5	.18	.7	43.6	ARGILLACEOUS SHALE (VERY WEATHERED)
ML16	24.8	2.50	9.94	.5	.19	.8	43.3	ARGILLACEOUS SHALE (VERY WEATHERED)
ML17	19.3	2.36	8.17	.5	.18	.9	60.3	COMPOSITE CLAYEY MATERIAL
ML8	21.8	2.39	9.10	.4	.17	.8	33.7	CLAY SOIL
ML9	9.3	1.96	4.75	.4	.10	1.1	27.7	SANDY SOIL

RC3, ML1-7 PENINSULA QUARRY; ML10-13 GRAN SASSO QUARRY; ML15-17 BRICKFIELDS QUARRY; ML8-9 DIEP RIVER SEDIMENT. D.I. IS INDEX OF WEATHERING (PARKER,1970)

TABLE 78B.

GALLIUM IN MALMESBURY SHALES, CAPE PROVINCE, SOUTH AFRICA. CLAY SIZE FRACTIONS, (<2 MICRONS).

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
RC3	CLAY FRACTION	38.4	3.30	11.65	.8	.30	.8	83.5	ARGILLACEOUS SHALE (FRESH)
ML5	CLAY FRACTION	30.9	2.33	13.25	.7	.27	.9	60.7	ARGILLACEOUS SHALE (FAIRLY FRESH)
ML1	CLAY FRACTION	29.6	2.40	12.29	.7	.26	.9	43.8	ARGILLACEOUS SHALE (VERY WEATHERED)
ML3	CLAY FRACTION	31.2	2.42	12.87	.7	.27	.9	32.3	ARGILLACEOUS SHALE (VERY WEATHERED)
ML4	CLAY FRACTION	26.3	1.74	15.12	.6	.22	.8	24.2	CLAY FROM SURFACE OF ML5
ML6	CLAY FRACTION	34.9	3.44	10.16	.8	.29	.8	54.9	ARENACEOUS GREYWACKE (FRESH)
ML7	CLAY FRACTION	31.9	2.43	13.09	.7	.26	.8	32.6	B ZONE SOIL, ARENACEOUS TYPE
ML11	CLAY FRACTION	35.9	2.78	12.88	.8	.28	.8	63.2	ARGILLACEOUS SHALE (FRESH)
ML10	CLAY FRACTION	30.3	2.42	12.53	.8	.29	1.0	57.8	ARGILLACEOUS SHALE (WEATHERED)
ML13	CLAY FRACTION	33.6	2.62	12.83	.7	.27	.8	58.9	ARGILLACEOUS SHALE (WEATHERED)
ML12	CLAY FRACTION	35.3	3.69	9.56	.8	.29	.8	52.5	ARENACEOUS GREYWACKE (FRESH)
ML15	CLAY FRACTION	27.8	1.88	14.75	.6	.23	.8	43.6	ARGILLACEOUS SHALE (VERY WEATHERED)
ML16	CLAY FRACTION	33.0	2.18	15.15	.7	.28	.8	43.3	ARGILLACEOUS SHALE (VERY WEATHERED)
ML17	CLAY FRACTION	30.5	2.02	15.10	.6	.25	.8	60.3	COMPOSITE CLAYEY MATERIAL
ML8	CLAY FRACTION	34.6	2.43	14.27	.7	.26	.8	33.7	CLAY SOIL
ML9	CLAY FRACTION	33.4	2.40	13.93	.7	.26	.8	27.7	SANDY SOIL

D.I. IN THIS TABLE IS THE INDEX OF WEATHERING (PARKER,1970) FOR THE ROCKS

TABLE 79A.

GALLIUM IN ROCKS FROM THE MALMESBURY SERIES AND THE SEA POINT CONTACT, CAPE PENINSULA, SOUTH AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
M11	THREE ANCHOR BAY	12.9	1.87	6.90	.4	.16	1.2		ARENACEOUS GREYWACKE
M15	DE WAAL DRIVE Q.	12.9	2.22	5.80	.4	.15	1.2		ARENACEOUS GREYWACKE
M39	Q., HIGH LEVEL RD	13.5		N.A.	.4	.13	.9		ARENACEOUS GREYWACKE
M41	NATIONAL Q.	12.1		N.A.	.4	.16	1.3		ARENACEOUS GREYWACKE
M43	GRAN SASSO Q.	11.5	1.95	5.89	.3	.11	1.0		ARENACEOUS GREYWACKE
M9A	SEA POINT PAVILION	22.7	2.39	9.50	.6	.23	1.0		ARGILLACEOUS SHALE
M10	THREE ANCHOR BAY	25.3	2.53	10.00	.6	.24	1.0		ARGILLACEOUS SHALE
M14	DE WAAL DRIVE Q.	27.2	2.78	9.80	.7	.25	.9		ARGILLACEOUS SHALE
M38	Q., HIGH LEVEL RD	23.0		N.A.	.6	.23	1.0		ARGILLACEOUS SHALE
M40	NATIONAL Q.	22.4	2.39	9.36	.6	.24	1.1		ARGILLACEOUS SHALE
M42	GRAN SASSO Q.	21.3	2.59	8.23	.7	.24	1.1		ARGILLACEOUS SHALE
M45	TABLE VIEW Q.	23.2	2.49	9.33	.6	.24	1.0		ARGILLACEOUS SHALE
M1		22.9	2.86	8.00	.6	.23	1.0		HORNFELS
M2		23.2	2.87	8.10	.6	.23	1.0		HORNFELS
M3		22.6	2.56	8.80	.6	.23	1.0		HORNFELS
M4		22.3	2.35	9.50	.6	.23	1.0		HORNFELS
M5		21.7	2.39	9.10	.6	.23	1.0		HORNFELS
M6		21.7	2.74	7.90	.6	.23	1.0		HORNFELS
M7		22.8	2.53	9.00	.6	.23	1.0		HORNFELS
M8		20.7	2.46	8.40	.6	.23	1.1		HORNFELS
M9	SEA POINT PAVILION	15.8	2.19	7.20	.6	.17	1.1		HORNFELS
M9B	SEA POINT PAVILION	15.5	2.28	6.80	.6	.21	1.3		HORNFELS

Q. = QUARRY

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 79B.

GALLIUM IN ROCKS FROM THE MALMESBURY SERIES AND THE SEA POINT CONTACT, CAPE PENINSULA, SOUTH AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
M19		22.6	2.51	8.99	.6	.24	1.1		HORNFELS XENOLITH
M19A		23.0		N.A.	.6	.23	1.0		HORNFELS XENOLITH
M26		21.8	2.56	8.50	.6	.23	1.1		HORNFELS XENOLITH
M27		22.2	2.68	8.30	.6	.23	1.1		HORNFELS XENOLITH
M24		27.0	3.25	8.30	.6	.25	.9		HORNFELS XENOLITH
M25		22.2	2.52	8.80	.6	.23	1.1		HORNFELS XENOLITH
M64 WC	BANTRY BAY	24.2		N.A.	.7	.25	1.1		HORNFELS XENOLITH
M21	CLIFTON XENOLITH	18.2	2.60	6.98	.5	.21	1.1		GRANITISED XENOLITH
M22	CLIFTON XENOLITH	32.2	3.58	9.00	.8	.29	.9		GRANITISED XENOLITH
M46A	SAUNDERS ROCKS	21.6	2.96	7.30	.6	.21	.9		GRANITISED XENOLITH
M46A WC	SAUNDERS ROCKS	21.4	2.92	7.30	.7	.25	1.2		GRANITISED XENOLITH
M46B WC	SAUNDERS ROCKS	20.2	2.64	7.63	.6	.23	1.2		GRANITISED XENOLITH
M46C	SAUNDERS ROCKS	21.7	3.05	7.10	.5	.20	.9		GRANITISED XENOLITH
M46C WC	SAUNDERS ROCKS	21.8	3.07	7.10	.7	.20	.9		GRANITISED XENOLITH
M46D WC	SAUNDERS ROCKS	20.7	2.96	6.99	.7	.25	1.2		GRANITISED XENOLITH
M29	BANTRY BAY	21.3	2.32	9.20	.6	.24	1.1		GRANITISED XENOLITH
M60	BANTRY BAY	21.4	2.71	7.89	.5	.20	.9		GRANITISED XENOLITH
M60 WC	BANTRY BAY	19.9	2.52	7.89	.6	.23	1.2		GRANITISED XENOLITH
M61	BANTRY BAY	18.0	2.44	7.37	.5	.18	1.0		GRANITISED XENOLITH
M61 WC	BANTRY BAY	17.5	2.38	7.37	.6	.23	1.3		GRANITISED XENOLITH
M62 WC	BANTRY BAY	22.5	2.59	8.67	.6	.24	1.1		GRANITISED XENOLITH
M63	BANTRY BAY	22.9	2.61	8.77	.5	.19	.8		GRANITISED XENOLITH
M63 WC	BANTRY BAY	23.6	2.69	8.77	.6	.24	1.0		GRANITISED XENOLITH

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 79C.

GALLIUM IN ROCKS FROM THE MALMESBURY SERIES AND THE SEA POINT CONTACT, CAPE PENINSULA, SOUTH AFRICA.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
M20		18.0	2.43	7.40	.5	.20	1.1		COARSE GRAINED GRANITE
M23		19.6	2.58	7.60	.6	.21	1.1		COARSE GRAINED GRANITE
M33		18.3	2.36	7.73	.6	.21	1.1		COARSE-GRAINED GRANITE
M34	CLIFTON XENOLITH	17.1	2.18	7.83	.6	.21	1.2		COARSE-GRAINED GRANITE
M31		15.0	2.34	6.40	.5	.19	1.3		FINE-GRAINED APLITIC GRANITE
M32	SAUNDERS ROCKS	14.3		N.A.	.4	.11	.7		FINE-GRAINED APLITIC GRANITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 80A.

GALLIUM IN ROCKS FROM THE KUNENE BASIC COMPLEX, KAOKOVELD, S.W.A.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
F-21		5.9	1.68	3.52	.3	.09	1.6	.2	SERPENTINITE-PERIDOTITE
A-2		13.6	1.75	7.74	.4	.14	1.0	18.7	TROCTOLITE
F-22		19.6	2.64	7.41	.6	.22	1.1	20.9	BASIC DYKE
F-6		14.0	1.09	12.81	.5	.16	1.2	23.6	TROCTOLITIC ANORTHOSITE
F-14		15.9	1.27	12.56	.6	.22	1.4	24.9	TROCTOLITIC ANORTHOSITE
F-10		15.8	1.26	12.53	.5	.17	1.1	26.8	TROCTOLITIC ANORTHOSITE
F-15		16.4	1.19	13.73	.6	.21	1.3	28.2	TROCTOLITIC ANORTHOSITE
A-1		17.1	1.44	11.90	.6	.23	1.3	28.3	TROCTOLITIC ANORTHOSITE
F-5		16.8	1.29	13.02	.5	.17	1.0	29.1	TROCTOLITIC ANORTHOSITE
F-16	EDGE OF COMPLEX	14.4	1.15	12.52	.5	.18	1.2	23.4	TROCTOLITIC ANORTHOSITE
F-7	]	15.2	1.16	13.07	.5	.16	1.1	22.8	TROCTOLITIC ANORTHOSITE
F-17	]	18.0	1.31	13.70	.6	.21	1.1	29.2	TROCTOLITIC ANORTHOSITE
F-18	]	17.2	1.30	13.20	.6	.21	1.2	28.9	TROCTOLITIC ANORTHOSITE
F-9	]	16.5	1.21	13.69	.6	.21	1.3	29.2	TROCTOLITIC ANORTHOSITE
A-5	]	16.2	1.27	12.72	.6	.22	1.4	31.4	TROCTOLITIC ANORTHOSITE
F-12	]	18.5	1.18	15.61	.5	.20	1.1	33.0	TROCTOLITIC ANORTHOSITE
F-13	]	18.3	1.23	14.90	.6	.21	1.1	33.9	TROCTOLITIC ANORTHOSITE
F-2	]	17.9	1.18	15.15	.5	.20	1.1	38.0	TROCTOLITIC ANORTHOSITE (ENJANDI)
F-3	]	17.5	1.22	14.35	.6	.21	1.2	33.4	TROCTOLITIC ANORTHOSITE (ENJANDI)
F-4	CENTER OF COMPLEX	18.7	1.25	14.90	.5	.20	1.1	39.3	TROCTOLITIC ANORTHOSITE (ENJANDI)

TABLE 80B.

GALLIUM IN ROCKS FROM THE KUNENE BASIC COMPLEX, KAOKOVELD, S.W.A.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
F-24	19.2	1.27	15.14	.6	.21	1.1	27.9	NORITIC ANORTHOSITE
A-3	19.2	1.27	15.09	.5	.21	1.1	30.0	NORITIC ANORTHOSITE
F-23	18.8	1.22	15.32	.5	.20	1.1	33.8	MASSIVE ANORTHOSITE
F-11	18.4	1.16	15.80	.5	.19	1.0	36.9	MASSIVE ANORTHOSITE
F-8	16.3	1.30	12.51	.6	.21	1.3	37.6	MASSIVE ANORTHOSITE
F-1	18.1	1.32	13.72	.5	.20	1.1	41.4	MASSIVE ANORTHOSITE
F-19	18.0	1.27	14.09	.5	.19	1.1	49.8	MASSIVE ANORTHOSITE
F-20	29.0	2.35	12.35	.6	.22	.8	51.6	MASSIVE ANORTHOSITE

TABLE 81.

GALLIUM IN METAMAFIC ROCKS FROM NAMAQUALAND, SOUTH AFRICA.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NOR 2	23.5		N.A.	.7	.25	1.1		HYPERSTHENITE
NOR 4	28.1		N.A.	.6	.23	.8		ANORTHOSITE
NOR 5	28.1		N.A.	.6	.24	.9		ANORTHOSITE
NOR 3	29.3		N.A.	.6	.25	.8		ANORTHOSITE
NOR 1	31.5		N.A.	.8	.31	1.0		NORITE
NOR 8	44.6		N.A.	.9	.36	.8		BIOTITE ANORTHOSITE

*** N.A. = AL2O3 NOT KNOWN ***

TABLE 82A.

GALLIUM IN ROCKS FROM THE ACTIVE CARBONATITE VOLCANO OLDOINYO LENGAI, TANZANIA.
LAVAS LISTED IN THEIR EXTRUSION SEQUENCE, OLDEST FIRST.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LAVAS INTERBEDDED WITH OLDEST YELLOW PYROCLASTICS								
BD 65	26.4	2.67	9.89	.6	.23	.9	77.8	PHONOLITE
BD 121	26.0	2.56	10.16	.6	.24	.9	76.9	PHONOLITE
BD 40	24.4	2.55	9.58	.7	.25	1.0	58.9	PHONOLITIC NEPHELINITE
BD 64	23.3	2.67	8.72	.6	.24	1.0	61.6	PHONOLITIC NEPHELINITE
LAVA BLOCKS IN YELLOW PYROCLASTICS								
BD 29	26.6	2.50	10.63	.6	.19	.7	75.8	PHONOLITE
BD 67	29.1	3.08	9.44	.6	.23	.8	73.2	PHONOLITE
BD 74	29.1	2.83	10.29	.6	.23	.8	77.3	PHONOLITE
LAVA BLOCKS IN BLACK PYROCLASTICS								
BD 50	27.1	2.57	10.53	.6	.23	.9	76.4	PHONOLITE
BD 54	26.7	3.05	8.74	.7	.25	.9	69.1	PHONOLITIC NEPHELINITE
BD 126	33.9	3.45	9.82	.6	.25	.7	73.9	PHONOLITIC NEPHELINITE

TABLE 82B.

GALLIUM IN ROCKS FROM THE ACTIVE CARBONATITE VOLCANO OLDOINYO LENGAI, TANZANIA.
LAVAS LISTED IN THEIR EXTRUSION SEQUENCE, OLDEST FIRST.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
LAVA FLOWS POSTDATING BLACK PYROCLASTICS								
BD 66	31.4	4.23	7.42	.8	.29	.9	45.7	NEPHELINITE
BD 119	33.8	4.11	8.23	.7	.28	.8	51.3	NEPHELINITE
BD 120	34.9	4.63	7.54	.7	.28	.8	51.5	NEPHELINITE
MODERN CARBONATITE LAVA FLOWS								
BD 114	< .4	< 9.68	.04	.4				CARBONATITE (LENGAITE)
BD 118	< .4	< 8.40	.05	.4				CARBONATITE (LENGAITE)
PLUTONIC BLOCKS IN YELLOW PYROCLASTIC ROCKS								
BD 91	33.8	3.37	10.01	.7	.26	.8	60.7	NEPHELINE SYENITE
BD 92	31.0	3.69	8.40	.7	.28	.9	52.2	IJOLITE
BD 4	11.8	3.65	3.22	.6	.21	1.7	4.0	JACUPIRANGITE
PLUTONIC BLOCKS IN BLACK PYROCLASTIC ROCKS								
BD 33	31.6	3.60	8.76	.7	.28	.9	45.9	MELTEIGITE

TABLE 83A.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
RING COMPLEX.
INNER ZONE, FIRST INTRUSION.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
AMPHIBOLE-NEPHELINE SYENITES								
11-33	31.9	3.99	8.00	.7	.20	.6	2.6	AMPHIBOLE-NEPHELINE SYENITE
13-31	33.4	4.35	7.67	.8	.29	.9	2.5	AMPHIBOLE-NEPHELINE SYENITE
13-33	32.8	3.97	8.24	.8	.28	.9	2.8	AMPHIBOLE-NEPHELINE SYENITE
NEPHELINE-AMPHIBOLE-PYROXENE SYENITES								
10-31A	45.8	5.77	7.94	.7	.29	.6	3.6	NEPHELINE-AMPHIBOLE-PYROXENE SYENITE
11-35A	43.7	5.50	7.94	.7	.28	.6	3.9	NEPHELINE-AMPHIBOLE-PYROXENE SYENITE
NEPHELINE-CANCRINITE-PYROXENE SYENITES								
10-33	40.0	4.40	9.09	.7	.27	.7	4.4	NEPH-CANC-PYROXENE SYENITE
11-29	44.6	5.10	8.74	.7	.26	.6	5.8	NEPH-CANC-PYROXENE SYENITE
12-29	45.0	5.44	8.26	.7	.22	.5	5.8	NEPH-CANC-PYROXENE SYENITE
11-35	42.0	4.61	9.10	.6	.25	.6	5.7	NEPH-CANC-PYROXENE SYENITE
12-34	44.4	4.58	9.67	.6	.25	.6	6.2	NEPH-CANC-PYROXENE SYENITE
14-33	41.0	4.77	8.60	.7	.27	.7	4.8	NEPH-CANC-PYROXENE SYENITE

D.I. IN THIS TABLE IS THE ENDOFENITIZATION INDEX (SEE TEXT).

TABLE 83B.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
RING COMPLEX.
OUTER ZONE, SECOND INTRUSION.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
NEPHELINE SYENITES								
9-37	21.2	2.16	9.83	.5	.18	.9	6.2	NEPHELINE SYENITE
11-41	20.2	1.96	10.32	.5	.18	.9	8.1	NEPHELINE SYENITE
13-41	20.4	1.87	10.89	.4	.16	.8	8.8	NEPHELINE SYENITE
NEPHELINE-CANCRINITE-HACKMANITE SYENITES								
9-27	23.6	1.98	11.93	.5	.20	.8	24.0	NEPH-CANC-HACKMANITE SYENITE
9-29	23.6	1.99	11.83	.5	.20	.8	22.0	NEPH-CANC-HACKMANITE SYENITE
9-34	26.3	2.26	11.62	.5	.21	.8	20.0	NEPH-CANC-HACKMANITE SYENITE
10-39	38.1	3.89	9.77	.6	.23	.6	12.6	NEPH-CANC-HACKMANITE SYENITE
12-39	24.6	2.13	11.55	.6	.21	.9	18.6	NEPH-CANC-HACKMANITE SYENITE
CANCRINITE-HACKMANITE SYENITES								
11-25	22.6	1.88	11.99	.5	.19	.8	25.2	CANCRINITE-HACKMANITE SYENITE
11-27	26.2	2.25	11.62	.5	.21	.8	18.0	CANCRINITE-HACKMANITE SYENITE
11-39	23.1	2.05	11.25	.5	.20	.9	18.5	CANCRINITE-HACKMANITE SYENITE
12-27	32.7	2.93	11.19	.5	.15	.5	25.1	CANCRINITE-HACKMANITE SYENITE
13-30	43.4	3.88	11.17	.5	.22	.5	20.0	CANCRINITE-HACKMANITE SYENITE
13-40	22.8	1.96	11.62	.5	.20	.9	19.7	CANCRINITE-HACKMANITE SYENITE
14-27	31.9	3.01	10.57	.5	.21	.7	21.4	CANCRINITE-HACKMANITE SYENITE
16-27	27.7	2.48	11.15	.5	.17	.6	19.1	CANCRINITE-HACKMANITE SYENITE

D.I. IN THIS TABLE IS THE ENDOFENITIZATION INDEX (SEE TEXT).

TABLE 83C.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
RING COMPLEX.
RELATED SUITE, THIRD INTRUSION.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
CONE-SHEET BRECCIAS								
9-31	51.0	5.52	9.22	.6	.25	.5	10.6	ERUPTIVE BRECCIA
10-31	43.5	4.27	10.18	.6	.23	.5	14.2	ERUPTIVE BRECCIA
10-35	22.0	2.31	9.50	.4	.16	.7	23.1	ERUPTIVE BRECCIA
PHONOLITES AND TINGUAITES								
9-34A	66.9	7.03	9.51	.6	.25	.4	34.7	
10-21A	44.4	4.29	10.34	.5	.23	.5	39.4	
13-46	35.1	3.04	11.53	.5	.21	.6	40.2	
13-47	38.1	3.42	11.13	.5	.22	.6	41.6	
17-42A	43.8	3.98	11.00	.5	.22	.5	27.4	
17-42B	45.2	4.15	10.88	.5	.23	.5	36.4	

D.I. IN THIS TABLE IS THE ENDOFENITIZATION INDEX (SEE TEXT).

TABLE 83D.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
RING COMPLEX.
RELATED SUITE, DYKES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
DOLERITES								
5-1A	21.0	2.72	7.69	.5	.20	.9	1.6	DOLERITE
16-43A	19.7	2.24	8.80	.6	.17	.9	2.0	DOLERITE
16-48A	18.9	2.37	7.96	.5	.19	1.0	1.8	DOLERITE
ALKALI TRACHYTES								
11-43A	23.8	2.51	9.47	.5	.20	.8	98.7	ALKALI TRACHYTE
15-40A	26.0	2.87	9.05	.5	.21	.8	70.1	ALKALI TRACHYTE
17-40A	32.8	3.52	9.32	.5	.21	.6	99.1	ALKALI TRACHYTE
17-41B	25.1	2.82	8.89	.6	.21	.8	99.8	ALKALI TRACHYTE

D.I. IN THIS TABLE IS THE ENDOFENITIZATION INDEX (SEE TEXT).

TABLE 83E.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
GRANITE AND FENITES 1.

SAMPLE	NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
GNEISSIC GRANITES									
16-21		11.4	1.80	6.33	.3	.10	.9	.6	ALKALINE GRANITE
FENITES 1									
16-38		13.0	1.98	6.54	.4	.13	1.0	1.1	ALKALINE GRANITE
16-22		12.5	1.86	6.71	.3	.10	.8	1.0	SUBALKALINE GRANITE
16-23		9.4	1.50	6.26	.3	.08	.9	1.5	SUBALKALINE GRANITE
16-33		13.8	1.88	7.31	.4	.13	1.0	1.2	SUBALKALINE GRANITE
16-39		13.8	2.08	6.62	.3	.11	.8	1.0	SUBALKALINE GRANITE
17-21		12.8	2.02	6.33	.3	.11	.8	1.2	SUBALKALINE GRANITE
17-23		14.9	2.11	7.03	.4	.13	.9	1.5	MONZONITIC GRANITE
17-50A		15.4	2.00	7.70	.4	.13	.9	2.1	MONZONITIC GRANITE

D.I. IN THIS TABLE IS THE FENITIZATION INDEX (SEE TEXT).

TABLE 83F.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
FENITES 2.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
15-38	14.2	1.93	7.34	.3	.11	.7	3.1	MONZONITIC GRANITE
15-39	14.9	1.99	7.47	.4	.13	.9	3.4	MONZONITIC GRANITE
16-37	15.0	1.94	7.70	.4	.14	.9	2.9	MONZONITIC GRANITE
16-43	14.7	2.11	6.99	.4	.13	.9	7.3	MONZONITIC GRANITE TRNS GRANODIORITE
17-33	17.0	2.07	8.20	.4	.16	.9	4.6	MONZONITIC GRANITE TRNS GRANODIORITE
14-40	20.9	2.34	8.93	.5	.17	.8	6.9	GRANODIORITE
15-40	20.1	2.34	8.59	.5	.17	.8	6.9	GRANODIORITE
16-40	20.4	2.37	8.61	.4	.16	.8	8.3	GRANODIORITE
17-37	16.9	2.10	8.03	.4	.16	1.0	4.9	GRANODIORITE

D.I. IN THIS TABLE IS THE FENITIZATION INDEX (SEE TEXT).

TABLE 83G.

GALLIUM IN ROCKS FROM THE NEJOIO AREA, ANGOLA.
FENITES 3 AND RHEOMORPHIC FENITES.

SAMPLE NAME	PPM GA	GA/AL X 10000	% AL	GA DTLM	GA ERROR PPM	GA ERROR %	D.I.	ROCK TYPE
FENITES 3								
15-41	20.6	2.34	8.79	.4	.16	.8	19.9	MONZONITIC GRANITE
17-278	23.3	2.71	8.60	.5	.18	.8	18.9	MONZONITIC GRANITE
11-23	17.4	2.14	8.13	.4	.16	.9	8.8	GRANODIORITE
14-39	17.2	2.16	7.94	.4	.16	.9	17.3	GRANODIORITE
16-24	21.9	2.43	9.01	.5	.17	.8	12.8	GRANODIORITE
16-26	20.6	2.33	8.84	.5	.17	.8	12.0	GRANODIORITE
16-31	15.2	1.87	8.10	.4	.14	.9	10.3	GRANODIORITE
16-35	20.0	2.46	8.13	.5	.17	.8	11.4	GRANODIORITE
17-30	18.5	2.27	8.15	.4	.15	.8	9.9	GRANODIORITE
17-31	18.5	2.25	8.20	.5	.17	.9	48.8	QUARTZITIC SYENODIORITE
RHEOMORPHIC FENITES								
15-36	17.4	2.06	8.45	.4	.16	.9	4.3	MICROGRANODIORITE
17-29	21.4	2.68	7.98	.5	.18	.9	24.3	MICROGRANODIORITE
17-35	20.3	2.52	8.06	.5	.18	.9	18.7	MICROGRANODIORITE
15-37	20.8	2.64	7.89	.5	.18	.9		SUBALKALINE MICROSYENITE

D.I. IN THIS TABLE IS THE FENITIZATION INDEX (SEE TEXT).